DOCUMENT RESUME

ED 337 678 CE 059 352

TITLE	Dairy Products Management. 2+2+2 Articulated Curriculum in Agricultural Technology: First Year Final Report. July 1, 1989-June 30, 1990.
INSTITUTION	Daingerfield-Lone Star Independent School District, Daingerfield, TX.; Northeast Texas Community Coll., Mount Pleasant.
SPONS AGENCY	Texas Education Agency, Austin.; Texas Higher Education Coordinating Board, Austin. Community Colleges and Technical Institutes Div.
PUB DATE	90
NOTE	354p.; For other curriculums in this series, see CE 059 349-351.
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01/PC15 Plus Postage.
DESCRIPTORS	Agricultural Education; Agricultural Production; *Animal Husbandry; *Articulation (Education); Business Administration; Career Development; *Competence; Competency Based Education; Course Content; *Dairy Farmers; Educational Objectives; *Farm Management; High Schools; Job Skills; Occupational Information; Off Farm Agricultural Occupations; State Curriculum Guides; Two Year Colleges; Units of Study; Vocational Education
IDENTIFIERS	*Dairy Products; Texas

ABSTRACT

This guide is for an articulated two-year high school, two-year college curriculum for dairy products management developed by two postsecondary and five secondary institutions and representatives of the private sector in Texas. The guide includes the following: (1) a brief description of the occupation of dairy products manager; (2) the basic objective of the curriculum; (3) extensive duty and task lists for dairy products management (including performance objective, standard, materials, enabling objective, and performance guide for each task); (4) a flowchart showing the recommended secondary and postsecondary course options; (5) recommended student prerequisites including academic courses; (6) basic course outlines for grades 9-14; (7) a list of secondary reference materials keyed to courses; (8) a line drawing of recommended secondary facilities; (9) a list of recommended tools/equipment and estimated costs; (10) a competency profile; (11) an example of the student monitoring and follow-up system; (12) career ladder information; (13) recommended teacher approval criteria; and (14) a sample articulation agreement. (KC)

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2+2+2 Articulated Curriculum

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Dairy Products Management

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"2+2+2" Articulated Agricultural Occupations Project

FIRST YEAR FINAL REPORT

July 1, 1989 - June 30, 1990

FIRST YEAR REPORT

"2+2+2" Articulated Agricultural Occupations Project
Dairy Products Management

Sponsored by:

Texas Education Agency
Division of Vocational Education

and

Texas Higher Education Coordinating Board
Community Colleges and Technical Institutes Division

Conducted by:

Daingerfield-Lone Star Independent School District

and

Northeast Texas Community College

FUNDING INFORMATION

Project Title:	Linking the Last Two (2) Years of High School and the First Two (2) Years of a Postsecondary Agriculture Technology
Texas Education Agency Project Number:	SAS #00420069
College Coordinating Board Project Number:	#00110003
Funding Source:	Carl D. Perkins Vocational Education Act, Title IIB
Texas Education Agency Project Officer:	Robert Patterson, Director Vocational Education Programs Texas Education Agency Austin, Texas
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Disclaimer:	This publication was prepared pursuant to a contract with the Texas Education Agency and the Texas Higher Education Coordinating Board. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view or opinions of the contractors, therefore, do not necessarily represent official Texas Education Agency or Texas Higher Education Coordinating Board position or policy.

ACKNOWLEDGEMENTS

The project involved the participation of a number of individuals to whom the project staff is very grateful. The success of the first year of the project would not have been possible without the input provided by the advisory committee. Special credit and gratitude is extended to the members of the project Technical Advisory Committee.

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Also, gratitude is expressed to Mr. Ed Hagen who conducted the horticultural development at Palo Alto College of San Antonio, Texas.

A very important "thank you" is extended to the consultants of both projects who devoted many evenings and weekends analyzing and synthesizing data and reporting the data in usable form. Consultants who contributed to the project results are as follows:

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I. FIRST YEAR RESULTS AND BENEFITS

Even with the late start of the project the following activities and products have been produced:

1. A commitment of the two postsecondary and five secondary institutions and representatives of the private sector has been made to develop and implement a "2+2 articulated curriculum" for the agricultural occupations of poultry products management, dairy products management, retail florist management, and garden center management.

2. A 2+2 articulated curriculum for the occupation of dairy products management has been developed. The 2+2 articulated curriculum for the dairy products manager includes:

   a. A brief description of the occupation of dairy products manager.
   b. The basic objective of the curriculum
   c. A flow chart showing the recommended secondary and postsecondary course options
   d. Recommended student prerequisites including academic courses
   e. Basic course outlines for grades 9-14
   f. A list of secondary reference materials
   g. A line drawing of recommended secondary facilities
   h. A list of recommended tools/equipment and estimated costs
   i. A competency profile
   j. An example of the student monitoring and follow-up system
   k. Recommended teacher approval criteria
   l. A sample articulation agreement

The 2+2 articulated curriculum for the dairy products manager is presented on the following pages.

It is anticipated that other school districts and two year postsecondary institutions will be able to use the curriculum as a model for linking instructional activities of secondary and postsecondary education for the preparation of technical workers in the agricultural industry.

II. JOB DESCRIPTION: DAIRY PRODUCTS MANAGER

The dairy products manager directs dairy production either independently or in conjunction with other managers pursuant to the objectives and policies of the employing company or individual.

Utilizes the management process to manage labor in a variety of dairy production settings. Collects data about employees, identifies specific training needs/problems, implements a plan of action, and evaluates outcomes of the initiated plan. Assists with production and procedures according to company policy and customer preferences.

Ensures quality of dairy products by serving as a positive role model for employees supervised. Accepts responsibility in managing, supervising, and teaching employees the importance of product quality to the customer and to the success of the company.

Performs duties on a tight schedule and must be capable of setting up and operating all equipment, operating on schedule, and maintaining sanitation and health practices to ensure a quality dairy product.

III. CURRICULUM OBJECTIVE

The curriculum is designed to produce an individual with skills, knowledge, and abilities sufficient to begin work as a dairy products manager in either the production or processing area of the dairy industry. The individual should perform safely and effectively in the position assigned to him by his employer. Graduates will be able to work independently or in a supervisory capacity.

IV. DUTY AND TASK LISTING FOR DAIRY PRODUCTS MANAGEMENT

The following is a chart showing the duty and task list for dairy products management. This list was compiled by a panel of dairy products employees. The panel consisted of employees/managers in the dairy production and dairy processing industries.

DAIRY PRODUCTS MANAGEMENT

DUTIES	TASKS									
A. MILKING,SANITIZING,AND MAINTAINING THE EQUIPMENT	1. Sanitize the milking system	2. Assemble milking equipment	3. Prep the cow for milking	4. Milk the cow with the milking machine	5. Monitor feed and milk cooling equipment	6. Clean the milking system	7. Maintain milking system			
B. MAINTAINING DAIRY HERD HEALTH	1. Identify ailments in order to obtain timely treatment	2. Administer medication and vaccinations	3. Sterilize tools and equipment	4. Store medicines/chemicals	5. Control parasites	6. Take an animal's temperature	7. Perform in-barn mastitis test	8. Keep health records on dairy animals	9. Inventory medical and chemical supplies	10. Test milk for antibiotics
C. BREEDING	1. Examine & treat reproductive system for breeding	2. Detect heat	3. Artificially inseminate cows and heifers	4. Handmate cows and heifers	5. Manage Sires	6. Record breeding data	7. Store semen and maintain breeding supplies	8. Pregnancy test bred cows and heifers		
D. HANDLING AND CARING FOR MILKING HERDS ACCORDING TO PRODUCTION	1. Check udder health	2. Monitor eating and milk production	3. Sort cows into herds	4. Segregate incompatible animals	5. Dry off cows					
E. HANDLING AND CARING FOR THE DRY HERD	1. Manage dry cows	2. Assist with calving	3. Produce healthy newborn calves	4. Remove extra teats						
F. HANDLING AND CARING FOR THE REPLACEMENT HERD	1. Manage baby calves 0-8 weeks	2. Manage calves 200-500 pounds	3. Identify animals	4. Dehorn animals						
G. FORMULATING AND FEEDING RATIONS	1. Identify & regulate access to feedstuffs causing off-flavored milk	2. Classify feedstuffs to nutritive value	3. Calculate nutritional requirements for animals	4. Mix & test feed ingredients to meet animal & ration requirements	5. Weigh animals	6. Feed animals	7. Clean feed and water troughs	8. Provide adequate water		
H. PRODUCING FORAGES	1. Design and follow a soil conservation plan	2. Prepare the seedbed	3. Plant forages	4. Control Diseases	5. Control Pests	6. Control Unwanted Plants	7. Determine harvest time and harvest forages	8. Store forages		

DAIRY PRODUCTS MANAGEMENT

DUTIES	TASKS									
I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS	1. Remove or add ballast weights to tractors	2. Attach farm equipment to the drawbar	3. Operate equipment	4. Store equipment	5. Perform seasonal preventative maintenance	6. Perform daily preventative maintenance on equipment	7. Replace universal joints	8. Maintain tires	9. Bleed diesel fuel systems	10. Change fuel filters
I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS	11. Change oil and oil filter	12. Flush and clean radiator	13. Replace thermostats	14. Replace radiator hoses	15. Install V-belts on pulleys	16. Install and adjust pulleys on motors	17. Install electric motor	18. Reverse electric motor	19. Service electric motors	20. Install and adjust roller chains
I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS	21. Install engine batteries	22. Service engine batteries	23. Service wheel or in-line bearings	24. Maintain tools	25. Adjust safety shields	26. Calibrate equipment				
J. MARKETING PRODUCTS AND ANIMALS	1. Market dairy animals/ products	2. Transport animals	3. Verify production records							
K. HANDLING AND DISPOSING OF ANIMAL WASTE	1. Manage and remove solid and liquid waste	2. Apply wastes to fields								
L. ASSIST IN SELECTING BREEDING ANIMALS	1. Cull animals	2. Select foundation stock	3. Select purchased and self-raised replacement stock	4. Select sires						
M. MAINTAINING BUILDINGS AND STRUCTURES	1. Construct and install doors	2. Hang sliding doors	3. Hang hinged doors	4. Paint wood surfaces	5. Paint metal surfaces	6. Apply creosote or other wood preservatives	7. Patch roofs	8. Install window panes	9. Weld metal using arc welder	10. Weld metal using oxy-acetylene unit
M. MAINTAINING BUILDINGS AND STRUCTURES	11. Cut metal using oxy-acetylene unit	12. Construct and maintain wooden fence	13. Construct and maintain wire fence	14. Construct and maintain electric fence	15. Construct and maintain gates	16. Hang Gates	17. Wire simple electric circuits	18. Connect electric switch	19. Connect lighting fixture	20. Attach plug and receptacle to electrical drop cord

DAIRY PRODUCTS MANAGEMENT

DUTIES	TASKS									
M. MAINTAINING BUILDINGS AND STRUCTURES	21. Replace fuses	22. Reset circuit breakers	23. Maintain a water system	24. Pour concrete floor	25. Construct block walls	26. Extinguish fires	27. Maintain ventilation equipment in dairy barns	28. Paint buildings		
N. MANAGING HAZARDOUS MATERIALS	1. Storing hazardous materials	2. Using hazardous materials	3. Disposing of hazardous materials	4. Managing dioxins						
O. MANAGING THE BUSINESS	1. Maintain health records on dairy animals	2. Inventory supplies	3. Maintain animal production records	4. Maintain pedigree records	5. Maintain equipment records	6. Maintain forage production records				
P. PREPARING FOR OWNERSHIP	1. Calculate interest costs	2. Formulate feasible repayment schedule	3. Prepare a cash flow budget for the dairy enterprise	4. Develop and negotiate a credit plan for the farm business	5. Calculate and record assets	6. Calculate and record liabilities	7. Calculate and record expenses	8. Calculate net income	9. Calculate amount of life insurance needed	10. Calculate and record depreciation
P. PREPARING FOR OWNERSHIP	11. Calculate and record net worth of farm businesses	12. Fill out income tax form: income or loss	13. Fill out federal income tax capital gains or loss	14. Fill out federal income tax investment credit schedule	15. Fill out federal income tax FICA schedule	16. Complete federal income tax form 1040	17. Hire workers	18. Dismiss workers	19. Develop a plan for amount of labor needed	20. Develop and assign work schedules
P. PREPARING FOR OWNERSHIP	21. Comply with employers legal requirements	22. Train employees	23. Develop written work agreements	24. Evaluate work performance	25. Develop production goals	26. Comply with industry production standards	27. Analyze trends in dairy product demand	28. Contract for professional management services	29. Develop plan for bestowing the estate	30. Calculate and record labor and management income
Q. STARTING UP HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION PROCESS	1. Inspect equipment prior to start-up	2. Adjust equipment for start-up	3. Prepare data recording equipment	4. Start up high-temperature, short-time pasteurization process						
R. PROCESSING HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION	1. Monitor pasteurization process	2. Adjust equipment for high-temperature, short-time processing		3. Record high-temperature, short-time processing data		4. Put product into storage tank				

DAIRY PRODUCTS MANAGEMENT

DUTIES	TASKS									
S. PERFORMING PRODUCT-TO-PRODUCT CHANGEOVER	1. Prepare lines and valves to bring new product to balance tank		2. Adjust equipment for product changeover	3. Complete product changeover process						
T. PERFORMING PRODUCT CHANGEOVER REQUIRING FLUSH-OUT	1. Operate lines following established sequence		2. Set recording data equipment for changeover/flush-out		3. Perform flush-out procedures	4. Inspect equipment for proper operation	5. Complete product changeover process			
U. SHUTTING DOWN HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION	1. Prepare high-temperature, short-time for shut-down		2. Shut down high-temperature, short-time system		3. Inspect recording data equipment					
V. CLEANING THE HIGH-TEMPERATURE, SHORT-TIME PASTEURIZER	1. Inspect and adjust equipment and lines for cleaning		2. Perform cleaning procedures							
W. APPLYING SAFETY PRACTICES	1. Comply with shop and equipment safety rules	2. Apply basic emergency first aid techniques	3. Complete accident report	4. Inspect work area and equipment for safe working environment		5. Use fire extinguisher	6. Correct safety hazards	7. Demonstrate cardiopulmonary resuscitation (CPR) techniques		
W. APPLYING SAFETY PRACTICES	8. Comply with safety requirements for working around automated systems		9. Participate in safety training program							

DUTY: A. MILKING, SANITIZING, AND MAINTAINING THE EQUIPMENT

TASK: 1. Sanitize the Milking System

****

Performance Objective: Given the materials listed below and a milking system, sanitize the milking system.

Standard: Each system must exhibit a bacterial count not in excess of prevailing market/milk plant standards.

Materials Needed: Acids, Brushes, Detergents, Drying Racks, Milking Equipment, Sanitizers, Washing Vats.

Enabling Objectives: Know the proper safety in handling acids.
Know how to use liquid measure.

Performance Guide:

1. Prepare washing solution
2. Wash exterior surfaces of milking equipment
3. Clean manual systems
   a. Draw hot water into washing receptacle
   b. Measure detergent and water conditioner according to container label
   c. Scrub equipment
   d. Rinse equipment in hot water
   e. Air dry equipment
4. Clean automated systems
   a. Check detergent and conditioner dispenser for contents and operation
   b. Maintain water temperature according to machine specifications
   c. Turn on washer and allow to complete cycle
   d. Activate sanitizing cycle prior to next milking

DUTY: A. MILKING, SANITIZING, AND MAINTAINING THE EQUIPMENT

TASK: 2. Assemble Milking Equipment

****

Performance Objective: Given the materials listed below and a milking system, assemble the milking equipment.

Standard: The system must meet milk market sanitation standards and operate according to proper procedure.

Materials Needed: Milking Equipment, Filters.

Enabling Objectives: Understand milking system operation.

Performance Guide:

1. Make sure the system has been sanitized
2. Install filters in the lines
3. Hook up lines from pump to bulk tank
4. Wash off milkers
5. Attach milkers to pulsator lines

DUTY: A. MILKING, SANITIZING, AND MAINTAINING THE EQUIPMENT

TASK: 3. Prep the Cow for Milking

****

Performance Objective: Given the materials listed below and a lactating dairy cow, prep the cow for milking.

Standard: Teats must be clean, distended, and gorged with milk indicating milk let-down.

Materials Needed: Bucket, California Mastitis Test Kit, Milk Sample Container, Paper Towel, Strip Cup.

Enabling Objectives: Must be able to recognize abnormalities of teats and udders.
Must be able to recognize abnormalities of milk.
Know how to perform the California Mastitis Test.

Performance Guide:

1. Examine the udder for:
    a. chapping
    b. leaking
    c. heat
    d. hardness
    e. bruises or abrasions
2. Wash udder and teats
3. Dry udder and teats
4. Perform strip cup test
5. Conduct a mastitis test if required
6. Submit sample of milk to a laboratory if necessary
7. Observe teats for physical indications of milk let-down

DUTY: A. MILKING, SANITIZING, AND MAINTAINING THE EQUIPMENT

TASK: 4. Milk the Cow with the Milking Machine

****

Performance Objective: Given the materials listed below and a lactating dairy cow, milk the cow with the milking machine.

Standard: Each cow must be completely milked out and exhibit an empty udder.

Materials Needed: Milker.

Enabling Objectives: Know how to properly set up milking equipment.
Know what medicine to apply to the teats.

Performance Guide:

1. Shut-off vacuum while moving machine
2. Keep teat cup out of bedding
3. Attach vacuum hose
4. Turn on vacuum
5. Place teat cups on teats
6. Adjust machine for proper position
7. Observe machine for presence of milk flow
8. Remove the milker when milk ceases to flow
9. Turn off vacuum
10. Apply medical treatment to the teats using teat cup

DUTY: A. MILKING, SANITIZING, AND MAINTAINING THE EQUIPMENT

TASK: 5. Monitor Feed and Milk Cooling Equipment

****

Performance Objective: Given materials below , monitor feed and cooling equipment for proper operation.

Standard: Feed handling equipment must be dispersing feed as set. Cooling equipment must be maintaining proper milk temperature as established by milk plant standards.

Materials Needed: Milk Cooling Equipment, Feed Handling Equipment.

Enabling Objectives: Know how to adjust temperature on cooling equipment.
Know how to read thermometer.
Know how to adjust feed handling equipment.
Know how to use feed scales.

Performance Guide:

1. Be able to identify faulty operation
2. Collect the feed from on feed dispenser in a container
3. Weigh the feed
4. Check feed weight against feed dispenser setting
5. Adjust dispenser for proper weight
6. Check temperature of milk cooling equipment for proper degree setting
7. Adjust as necessary

DUTY: A. MILKING, SANITIZING, AND MAINTAINING THE EQUIPMENT

TASK: 6. Clean the Milking System

****

Performance Objective: Given the materials listed below and a milking system, clean the milking system.

Standard: Each system must exhibit a bacterial count not in excess of prevailing market/milk plant standards.

Materials Needed: Acids, Brushes, Detergents, Drying Racks, Milking Equipment, Sanitizers, Washing Vats.

Enabling Objectives: Know the proper safety in handling acids.
Know how to use liquid measure.

Performance Guide:

1. Prepare washing solutions
2. Wash exterior surfaces of milking equipment
3. Clean manual systems
   a. Draw hot water into washing receptacle
   b. Measure detergent and water conditioner according to container label
   c. Scrub equipment
   d. Rinse equipment in hot water
   e. Air dry equipment
4. Clean automated systems
   a. Check detergent and conditioner dispenser for contents and operation
   b. Maintain water temperature according to machine specifications
   c. Turn on washer and allow to complete cycle
   d. Activate sanitizing cycle prior to next milking

DUTY: A. MILKING, SANITIZING, AND MAINTAINING THE EQUIPMENT

TASK: 7. Maintain Milking System

****

Performance Objective: Given the materials listed below and a milking system, maintain the milking system.

Standard: The system must operate according to equipment specifications and handle milk according to local market standards.

Materials Needed: Brush, Bucket, Filters, Gaskets, Milker, Milker Hoses, Oil, Pipe Line, Vacuum Gauge.

Enabling Objectives: Know how to read a pressure gauge.
Know how to properly install inflations.

Performance Guide:

1. Check vacuum system for correct pressure (12-15 p.s.i.)
2. Clean and replace necessary parts
3. Inspect for milking process build up
4. Check pulsators and clean if necessary
5. Replace inflations when cracked, hard, or deteriorated
6. Check milk and vacuum hose for leaks
7. Install inflations

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 1. Identify Ailments in Order to Obtain Timely Treatment

****

Performance Objective: Given materials listed below and a dairy herd, identify ailments of dairy animals.

Standard: All common ailments must be identified by the farmer or he/she must request veterinarian assistance.

Materials Needed: Animal Rectal Thermometer, Animal Stethoscope.

Enabling Objectives: Know the symptoms of various diseases.
Know how to read a thermometer.
Know how to properly use a stethoscope.

Performance Guide:

1. Observe animals for abnormal behavior
2. Isolate the animal(s)
    a. close observation
    b. control spread of ailment
3. Determine ailment
    a. observe vital signs
    b. results of observations
    c. compare results with cattle disease reference
4. Record findings on health chart
5. Contact veterinarian if necessary

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 2. Administer Medication and Vaccinations

****

Performance Objective: Given materials listed below and a dairy herd, administer medication.

Standard: All medication must be administered according to specifications on the container or according to a veterinarian's directions.

Materials Needed: Balling (Bolus) Gun, Gravity Flow Intravenous Unit, Frick Speculum Tube, Hypodermic Syringe, Nasal Syringe, Oral Liquid Drench Syringe, Oral Paste Gun, Stomach Tube.

Enabling Objectives: Know how to operate equipment to administer medication.
Know symptoms of adverse reactions to medications.

Performance Guide:

1. Read all instructions on medicine labels
2. Gather equipment/tools
3. Sterilize equipment/tools
4. Clean the injection or medication site
5. Medicate animals
    a. hypodermic injections
    b. oral
    c. topical
6. Check animal for adverse reactions to medications

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 3. Sterilize Tools and Equipment

****

Performance Objective: Given materials listed below and dairy health tools/equipment, sterilize health tools and equipment.

Standard: All health tools and equipment must be free of any foreign substance.

Materials Needed: Detergent, Hot Plate, Pot, Steam Sterilizer, Towel.

Enabling Objectives: Know how to operate a hot plate safely.
Know how to use chemicals safely.

Performance Guide:

1. Dismantle health tools/equipment
2. Clean health tools/equipment
    a. strong detergent
    b. boil or steam
    c. chemical disinfectant
3. Sterilize health tools/equipment
    a. boil or steam
    b. chemical disinfectant
4. Dry health tools/equipment
5. Coat rubber parts with sterile preservative
6. Reassemble with tensions off
7. Store in clean dry area

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 4. Store Medicines/Chemicals

****

Performance Objective: Given materials listed below and medicines and chemicals, store medicines and chemicals.

Standard: All medicines and chemicals must be stored in a safe manner according to label specifications.

Materials Needed: Lock and Key, Refrigerator, Storage Cabinet, Storage Record.

Enabling Objectives: None.

Performance Guide:

1. Read all labels
2. Locate or provide the required storage container or area
   a. secure
   b. clean
   c. dry
   d. refrigerated
3. Post a warning sign on the area or container
4. Secure the storage area or container with a lock
5. Maintain an accurate and up-to-date record of all medicines and chemicals
   a. date of purchase
   b. use and date of uses

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 5. Control Parasites

****

Performance Objective: Given materials listed below and a dairy herd, control external and internal parasites.

Standard: All animals must be free of parasites.

Materials Needed: Bailing (Bolus) Gun, Dipping Vat, Duster, Fogger Hypodermic Syringe, Liquid Drench Syringe, Mister, Oral Paste Gun, Sprayer.

Enabling Objectives: Know how to identify external parasites.
Know symptoms of animals with internal parasites.
Know the life cycle of various parasites.
Know how to use treating equipment.

Performance Guide:

1. Collect external parasite sample for identification
2. Identify external parasites
    a. lice
    b. mites
    c. flies
3. Treat external parasites with approved chemicals
    a. spray
    b. dip
    c. fog
    d. dust
4. Collect fecal samples for identification of internal parasites
5. Identify internal parasites
6. Administer medicines for internal parasite control
    a. time with parasites life cycle
    b. treat with injection
    c. treat with oral medicine
7. Identify external fungus and virus infections

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 5. Control Parasites (Continued)

****

8. Treat external fungus and virus infections
    a. vaccination
    b. topical medication
    c. surgical removal by a veterinarian
    d. isolate infected animal
9. Develop an annual plan for parasitic control

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 6. Take an Animals Temperature

****

Performance Objective: Given materials listed below and a dairy herd, take an animal's temperature.

Standard: The animal's rectal temperature must be determined within one-tenth of a degree.

Materials Needed: Animal Rectal Thermometer with spring clip attached, Paper towel

Enabling Objectives: Know proper restraint methods.
Know how to read a thermometer.

Performance Guide:

1. Restrain animal
2. Shake down thermometer
3. Lubricate thermometer
4. Insert thermometer into animal's anus
5. Remove after 2-3 minutes
6. Wipe clean
7. Record temperature
8. Disinfect thermometer
9. Store thermometer

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 7. Perform In-barn Mastitis Test

****

Performance Objective: Given materials listed below and a dairy cow, perform in-barn mastitis test.

Standard: All cows will be tested and evaluated for treatment if necessary.

Materials Needed: California Mastitis Text Kit, Mastitis Medicine.

Enabling Objectives: Understand how to properly use California Mastitis Test.

Performance Guide:

1. Strip milk from each teat into paddle
2. Add coagulant solution to milk
3. Stir milk and solution together
4. Observe milk for signs of coagulation
5. Treat cows that are infected

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 8. Keep Health Records on Dairy Animals

****

Performance Objective: Given materials listed below and dairy herd health information, record all health data.

Standard: All records must be accurate and up-to-date.

Materials Needed: Breeding Records, Health Records, Veterinarian Bills.

Enabling Objectives: None.

Performance Guide:

1. Initiate animal's health record at birth or acquisition
2. Record animal's identity
3. Record management treatments
    a. dehorning
    b. extra teat removal
    c. hoof trimming
    d. identifying marks or tags
    e. vaccinations
    f. parasite treatments
    g. calving and reproduction problems
    h. mastitis treatment
    i. magnet implanting
4. Record disease or injury treatments
    a. diagnosis
    b. medicine administered
    c. prognosis
    d. veterinarian consulted
5. Record death or sale information

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 9. Inventory Medical and Chemical Supplies

****

Performance Objective: Given materials listed below, prepare an inventory of the supplies.

Standard: All materials must be on the inventory spelled according to the labels.

Materials Needed: Medical Supplies (or empty boxes and bottles), Chemical Supplies (or empty boxes and bottles), Inventory Form, Pencil.

Enabling Objectives: Must be familiar with medicines used.
Must be familiar with various chemicals used.

Performance Guide:

1. Identify all medical supplies by common name and list on inventory form
    a. Give the number of boxes or bottles
    b. List the total doses for dairy animals
2. Identify all chemicals supplies by common name and list on inventory form
    a. Give the number of boxes or bottles
    b. List the total quantity of chemicals of each type

DUTY: B. MAINTAINING DAIRY HERD HEALTH

TASK: 10. Test Milk for Antibiotics

****

Performance Objective: Given materials listed below and a milk sample, test the milk for antibiotics.

Standard: The milk samples must have antibiotic levels within milk plant standards.

Materials Needed: Antibiotic Test Kit, Milk Sample.

Enabling Objectives: Know how to take a milk sample.
Know how to use the antibiotic test kit.
Know how to read the color chart properly.

Performance Guide:

1. Add spore suspension to melted agar medium
2. Put medium in petri dish to form a uniform layer
3. Dip 1/2 inch filter paper disc in the milk sample
4. Place the filter paper on the agar surface
5. Allow the mixture to incubate
6. Read the color against the color chart

DUTY: C. BREEDING

TASK: 4. Handmate Cows and Heifers

****

Performance Objective: Given materials listed below and a cow or heifer in heat, inseminate the animal.

Standard: All animals in heat must be bred and settled.

Materials Needed: Breeding Records, Bull.

Enabling Objectives: Know how to handle bull safely.

Performance Guide:

1. Check record book for freshening (calving) date
2. Check cow's physical condition
3. Inseminate cow or heifer
    a. natural
        (1) separate bull
        (2) have veterinarian check bull's semen and general health prior to each breeding season
        (3) turn bull in with cow or heifer
        (4) remove bull after 24 hours

DUTY: C. BREEDING

TASK: 5. Manage Sires

****

Performance Objective: Given materials listed below and a bull; feed, manage and safely handle sires.

Standard: Bulls must be handled and managed without injury to bull or person handling.

Materials Needed: Pens, Facilities, Feed, Feed Trough, Water, Water Trough.

Enabling Objectives: Knowledge of Animal Temperament.

Performance Guide:

1. Move bulls from one pen to another safely
2. Place feed in feed trough
3. Place water in water trough
4. Observe bull for signs of disease or injury

DUTY: C. BREEDING

TASK: 1. Examine and Treat Reproductive System for Breeding

****

Performance Objective: Given materials listed below, check reproductive system for breeding, and infuse infected tracts.

Standard: Identify sound and/or infected-abnormal reproductive systems.

Materials Needed: Plastic Sleeve, Lubricant, Restraining Equipment, Cattle.

Enabling Objectives: Knowledge of reproductive anatomy.
Knowledge of treatment procedures.

Performance Guide:

1. Restrain cattle
2. Put on plastic sleeve
3. Lubricate sleeve with lubricant
4. Check reproductive tract for abnormalities
5. Treat/infuse any infected tracts

DUTY: C. BREEDING

TASK: 2. Detect Heat

****

Performance Objective: Given materials listed below and a herd of dairy cows, detect heat.

Standard: All cows in heat must be detected.

Materials Needed: Breeding Chart, Breeding Records, Chin-ball Marker, Patch Heat Detector, Pocket Record.

Enabling Objectives: Understand physical signs of heat.
Understand estrus cycles.
Have knowledge of reproductive anatomy.

Performance Guide:

1. Observe for heat activity
    a. individual behavior
    b. herd mates' behavior
    c. mechanical heat indicator results
2. Record breeding observations

DUTY: C. BREEDING

TASK: 3. Artificially Inseminate Cows and Heifers

****

Performance Objective: Given materials listed below and a cow or heifer in heat, inseminate the animal.

Standard: All animals in heat must be bred and settled.

Materials Needed: Breeding Records, Cannisters, Clipper, Gloves, Straw Insemination Gun, Paper Towels, Plastic Sleeve, Semen, Semen Tank, Straws.

Enabling Objectives: Must know how to properly inseminate animals.

Performance Guide:

1. Check record book for freshening (calving) date
2. Check cow's physical condition
3. Inseminate cow or heifer
    a. artificially
        (1) select semen
        (2) restrain animal
        (3) thaw semen
        (4) put plastic sleeve on
        (5) clean vulva
        (6) inseminate cow or heifer
        (7) clean-up equipment
        (8) discard waste materials
4. Record breeding data

DUTY: C. BREEDING

TASK: 6. Record Breeding Data

****

Performance Objective: Given materials listed below and dairy herd information, record breeding data.

Standard: Breeding data on all animals must be accurate and up-to-date.

Materials Needed: Barn Chart, Breeding Slip, Breeding Wheel, Gestation Table, Herd Book, Pocket Record, Record Sheets, Semen Record Book, Veterinarian Bills.

Enabling Objectives: Be able to understand record systems.
Know how to read gestation table.

Performance Guide:

1. Record data of heat cycle
2. Record insemination data
    a. date, individual female and bull information and technician
    b. calculate due date
3. Record pregnancy check data
4. Record freshening (calving) data
5. Record bull data
    a. semen
    b. bull (natural service)

DUTY: C. BREEDING

TASK: 7. Store Semen and Maintain Breeding Supplies

****

Performance Objective: Given materials listed below and frozen semen, store semen.

Standard: Semen must not thaw before insemination.

Materials Needed: Canes, Cannisters, Gloves, Measuring Stick, Nitrogen Tank, Semen, Semen Record Book.

Enabling Objectives: Be familiar with safety involved in handling liquid nitrogen.

Performance Guide:

1. Place nitrogen tank in safe area
    a. temperature and humidity
    b. safe from collision abuse
    c. safe from inadvertent tampering
2. Maintain liquid nitrogen level in tank above cannisters
3. Replace semen in cannister and store
4. Record the addition or removal of all semen

DUTY: C. BREEDING

TASK: 8. Pregnancy Test Bred Cows and Heifers

****

Performance Objective: Given materials listed below and bred cows or heifers, arrange pregnancy check for bred cows and heifers.

Standard: Cows or heifers must be diagnosed as pregnant or barren.

Materials Needed: Barn Chart, Breeding Wheel, Pocket Record.

Enabling Objectives: Be able to palpate.
Be able to prepare cattle for inspection by vet.

Performance Guide:

1. Check breeding date
2. Palpate the cows at 42 to 45 days after breeding
3. Record diagnosis

DUTY: D. HANDLING AND CARING FOR MILKING HERDS ACCORDING TO PRODUCTION

TASK: 1. Check Udder Health

****

Performance Objective: Given materials listed below and a dairy herd cow check the udder for signs of unhealthiness.

Standard: Each cow's udder is checked visually and with the equipment listed and determined to be healthy or unhealthy.

Materials Needed: Strip Cup, CMT Test Kit.

Enabling Objectives: Know symptoms of an unsound udder.
Know how to use a CMT Kit.

Performance Guide:

1. Visually appraise udder
2. Use strip cup to check for mastitis
3. Use CMT Test Kit to check for mastitis

DUTY: D. HANDLING AND CARING FOR MILKING HERDS ACCORDING TO PRODUCTION

TASK: 2. Monitor Eating and Milk Production

****

Performance Objective: Given materials listed below and a dairy herd, monitor eating and milk production.

Standard: All animals off feed and production will by identified.

Materials Needed: Production Records, Feeding Records.

Enabling Objectives: None.

Performance Guide:

1. Observe cattle as they eat
2. Check feeding records against observation
3. Check production records
4. Observe and record current production
5. Compare production records against current production

DUTY: D. HANDLING AND CARING FOR MILKING HERDS ACCORDING TO PRODUCTION

TASK: 3. Sort Cows Into Herds

****

Performance Objective: Given materials listed below and a milking herd, sort cows into herds.

Standard: All cows with similar production will be grouped together.

Materials Needed: Milking Herd with Identification Tags, Holding Pens, Separating Equipment, Production Record.

Enabling Objectives: Ability to interpret production records and handle milk cows.

Performance Guide:

1. Move entire herd into holding pens
2. Move cattle into separating equipment as needed
3. Identify each cow by tag number
4. Check production records on each cow
5. Determine production levels for each herd
6. Place cows in appropriate herd

DUTY: D. HANDLING AND CARING FOR MILKING HERDS ACCORDING TO PRODUCTION

TASK: 4. Segregate Incompatible Animals

****

Performance Objective: Given materials listed below and dairy cows identify and segregate incompatible animals.

Standard: All incompatible animals must be segregated.

Materials Needed: Separating Equipment and/or holding pens.

Enabling Objectives: Be able to effectively work and separate cattle.
Be able to identify incompatible animals.

Performance Guide:

1. Move entire herd into holding pens
2. Move cattle into separating equipment as needed
3. Identify each animal as compatible or incompatible
4. Separate and segregate incompatible animals

DUTY: D. HANDLING AND CARING FOR MILKING HERDS ACCORDING TO PRODUCTION

TASK: 5. Dry Off Cows

****

Performance Objective: Given materials listed below and a lactating dairy herd, dry-off cows.

Standard: All cows must be dried-off no later than two months prior to calving.

Materials Needed: Breeding Records, Health Records, Infusion Tubes, Mastitis Test.

Enabling Objectives: Know how to use the CMT Kit.
Know procedure for dry-treating the udder.

Performance Guide:

1. Check breeding records
2. Stop milking (dry-off) cows no later than the tenth month of lactation
3. Check each quarter with a mastitis test
4. Milk all quarters dry
5. Dry-treat the udder
6. Segregate dry cows
7. Observe dry-treated udders periodically

DUTY: E. HANDLING AND CARING FOR THE DRY HERD

TASK: 1. Manage Dry Cows

****

Performance Objective: Given materials listed below and dry cows, manage the dry cows for health and nutrition.

Standard: All cows will remain healthy and in proper condition.

Materials Needed: Feeders, Facilities, Nutritional Analysis Table, Feed.

Enabling Objectives: Understand proper flesh condition (over and under).
Understand signs of health problems.

Performance Guide:

1. Use nutritional analysis table to determine proper nutritional requirements
2. Analyze feed available to determine nutrient levels
3. Feed dry cows according to nutritional requirements
4. Evaluate dry cows for health problems

DUTY: E. HANDLING AND CARING FOR THE DRY HERD

TASK: 2. Assist With Calving

****

Performance Objective: Given materials listed below and a calving cow, assist the cow with calving.

Standard: All cows must be aided by the farmer and/or veterinarian during calving.

Materials Needed: Breeding Records, Bucket, Calf Puller, Obstetric Chains, Plastic Sleeve.

Enabling Objectives: Know the Parturition Process.
Know the Normal Presentation of a calf.

Performance Guide:

1. Check and confirm calving dates
2. Observe for signs of calving
   a. physiological changes
   b. individual behavior
3. Provide a clean, dry pen
4. Observe calving process
   a. always with first-calf heifers
   b. as needed with mature cows
5. Determine position of calf
6. Assist if calf presented in an incorrect position
7. Contact veterinarian if complications occur
8. Provide colostrum within 36 hours of birth
9. Make sure all calves are breathing properly

DUTY: E. HANDLING AND CARING FOR THE DRY HERD

TASK: 3. Produce Healthy Newborn Calves

****

Performance Objective: Given materials listed below and cows with newborn calves, formulate a baby calf management program.

Standard: All baby calves will survive and grow at the proper rate.

Materials Needed: Calf Facilities, Bottle, Milk Replacer, Calf Scour Medicine.

Enabling Objectives: Causes and signs of calf scours.
Nutritional requirements for baby calves.

Performance Guide:

1. Check cow's milk supply for milk letdown and signs of problems
2. Evaluate colostrum consumption by new-born calf
3. Place calves in calf facilities
4. Mix milk replacer according to product specifications and put in milk bottle
5. Feed baby calf with bottle
6. Determine proper environment for baby calves.

DUTY: E. HANDLING AND CARING FOR THE DRY HERD

TASK: 4. Remove Extra Teats

****

Performance Objective: Given materials listed below and dairy heifer calves, remove extra teats.

Standard: All excess teats must be removed.

Materials Needed: Clamp Forceps, Rope, Rope Halter, Surgical Scissors.

Enabling Objectives: Must be able to illustrate mammary anatomy.

Performance Guide:

1. Inspect heifer calves for extra teats
2. Restrain the animal
3. Sanitize surgical equipment
4. Crimp extra teat(s) at base with clamp forceps
5. Cut off extra teat(s) with surgical scissors
6. Apply topical medication
7. Check for proper healing

DUTY: F. HANDLING AND CARING FOR THE REPLACEMENT HERD

TASK: 1. Manage Baby Calves 0-8 Weeks

****

Performance Objective: Given materials listed below, manage baby calves.

Standard: All baby calves will remain healthy.

Materials Needed: Milk supplement Equipment, Medication Tools, Pens, Feed Equipment.

Enabling Objectives: Know how to properly feed baby calves. Know about the health and treatment of baby calves.

Performance Guide:

1. Select the equipment for feeding baby calves
    a. Mix the supplement
    b. Feed the supplement
    c. Clean the equipment
2. Identify sicknesses in calves
    a. Diagnose diseases or parasites
    b. Select medication program
    c. Administer the medication

DUTY: F. HANDLING AND CARING FOR THE REPLACEMENT HERD

TASK: 2. Manage Calves 200-500 Pounds

****

Performance Objective: Given materials listed below and a replacement herd, care for and manage the weaned calves.

Standard: All animals will be cared for to insure proper growth and development.

Materials Needed: Facilities, Feed Equipment, Veterinarian Equipment, Records, Feed.

Enabling Objectives: Be able to explain proper livestock management.

Performance Guide:

1. Select equipment for feeding calves
    a. prepare and measure feed
    b. feed the calf
    c. clean the feeder daily
2. Identify symptoms of diseases or parasites
    a. diagnose disease or parasites in calves
    b. select the medication program
    c. Administer the medication

DUTY: F. HANDLING AND CARING FOR THE REPLACEMENT HERD

TASK: 3. Identify Animals

****

Performance Objective: Given materials listed below and a dairy herd, identify animals.

Standard: All animals must receive a personal identification mark within seven days of birth or acquisition.

Materials Needed: Breeding Records, Calf Registration Papers, Camera, Freeze Brands, Metal tagger, Metal Tags, Neck chains and Numbers, Plastic tagger, Plastic Tags, Tattoo Set.

Enabling Objectives: Know how to apply various identification methods.

Performance Guide:

1. Select an identification system
    a. ear tattoos
    b. metal ear tags
    c. plastic ear tags
    d. neck chains
    e. freeze branding
    f. color markings and physical characteristics
2. Apply initial identification tag as soon as born or acquired
3. Record tag numbers and other data
4. Record color markings for registration purposes
5. Reapply personal identification

DUTY: F. HANDLING AND CARING FOR THE REPLACEMENT HERD

TASK: 4. Dehorn Animals

****

Performance Objective: Given materials listed below and horned dairy animals, dehorn animals.

Standard: Dehorned animals must exhibit a smooth natural poll with no evidence of infection.

Materials Needed: Electric Dehorner, Forceps, Guillotine Dehorner, Gouge Dehorner, Restraining Chute, Scoop Dehorner, Tube Dehorner.

Enabling Objectives: Apply various dehorning procedures.

Performance Guide:

1. Select method of dehorning based on horn size and season
   a. caustic paste
   b. electric dehorner
   c. scoop and gouge dehorner
   d. guillotine dehorner
2. Remove horn
3. Control bleeding
   a. blood clotting substance
   b. pressure points
4. Medicate wound
5. Check animals periodically for proper healing
6. Consult veterinarian if necessary

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 1. Identify and Regulate Access to Feedstuffs Causing Off-flavored Milk

****

Performance Objective: Given materials listed below identify feedstuffs which cause off-flavored milk.

Standard: All feeds which cause off-flavored milk must be identified.

Materials Needed: Various Feedstuffs, Milk Samples.

Enabling Objectives: Know the characteristics of feedstuffs which cause off-flavored milk.

Performance Guide:

1. Determine if each feedstuff can cause off-flavored milk
2. Record the feedstuffs determined to cause off-flavored milk
3. Taste samples of prepared milk
4. Identify the feedstuff which caused the off-flavor

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 2. Classify Feedstuffs to Nutritive Value

****

Performance Objective: Given materials listed below , classify the feeds as roughages or concentrates and determine the nutritional value.

Standard: All feedstuffs will be classified as either roughages or concentrates and their nutritional value recorded.

Materials Needed: Various Feedstuffs, Feeds and Feeding Nutritional Chart.

Enabling Objectives: Know the characteristics of a roughage or concentrate.

Performance Guide:

1. Observe each feedstuff sample
2. Identify the feedstuff
3. Classify each feedstuff as a roughage or concentrate
4. Use the nutritions chart to record the nutritional information about each feedstuff

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 3. Calculate Nutritional Requirements for Animals

****

Performance Objective: Given materials listed below and a dry cow, producing cow, and growing heifer, calculate the nutritional requirements for these animals for optimum production and cost efficiency.

Standard: A ration will be developed for all classes of dairy animals having maximum efficiency and minimum cost.

Materials Needed: Production Records, Feeding Standards, Commodity Price List, Calculator, List of Feedstuffs Available.

Enabling Objectives: Knowledge and understanding of how to feed dairy cattle for maximum efficiency and least cost.

Performance Guide:

1. Determine the cost/lb. for each feedstuff available
2. Determine the nutritional requirements for each type of animal
3. Compute a balanced ration for each type of animal using the feedstuffs available
4. Analyze the ration for nutritional requirements and cost efficiency
5. Record the results

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 4. Mix and Test Feed Ingredients to Meet Animal and Ration Requirements

****

Performance Objective: Given materials listed below and the feedstuffs required by a given ration, mix feed ingredients to meet ration requirements.

Standard: All feed ingredients must be proportioned and distributed evenly according to the requirements of the balanced ration.

Materials Needed: Batch Mixture, Broom, Forage Metering or Weighing Device, Drain Scoop, Grinder - Mixer, Micro-element Meter, Roller Mill, Supplement Meter.

Enabling Objectives: Know feedstuffs that effect milk quality.
Know how to weigh with scales.
Know how to operate machinery safely.

Performance Guide:

1. Check feedstuffs for abnormal conditions
2. Regulate access to feedstuffs that affect milk
3. Weigh ingredients according to a balanced least-cost ration
4. Blend the ingredients

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 5. Weigh Animals

****

Performance Objective: Given the materials listed below and animals, weigh the animals.

Standard: All animals will be weighed to within 5 lbs. of actual weight.

Materials Needed: Scales, Facilities.

Enabling Objectives: Know how to operate the scales.

Performance Guide:

1. Balance the scales
2. Move the animal to be weighed onto the scales
3. Weigh the animal
4. Remove the animal from the scales

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 6. Feed Animals

****

Performance Objective: Given materials listed below and a mixed ration, feed animals.

Standard: Every animal must be fed according to its representative balanced ration, on schedule, and without contamination.

Materials Needed: Belt Feeder or Conveyers, Broom, Bucket, Forage Fork, Scales, Scoop.

Enabling Objectives: Know how to operate scales.
Know what feeds cause off-flavors.

Performance Guide:

1. Clean feeding system
2. Inspect prepared feeds for off-flavors
3. Measure feed according to individual animal's requirements
4. Feed animals according to a planned schedule
5. Check that the specified amount was delivered
6. Check for animal acceptance

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 7. Clean Feed and Water Troughs

****

Performance Objective: Given materials listed below and a livestock feed and water trough, clean the troughs.

Standard: All foreign materials, soil and manure, must be removed and the troughs washed and thoroughly cleaned.

Materials Needed: Wheel Barrow, Water, Bucket, Rubber Gloves, Rubber Boots, Goggles, Disinfectant, Hose.

Enabling Objectives: None.

Performance Guide:

1. Remove leftover water or feed
2. Remove foreign materials (soil, manure, straw, etc.)
3. Wash and scrub all surfaces
4. Disinfect with strong disinfectant

CAUTION: Follow manufacturer's recommendation. Wear protective clothing

DUTY: G. FORMULATING AND FEEDING RATIONS

TASK: 8. Provide Adequate Water

****

Performance Objective: Given materials listed below and a dairy herd, water animals.

Standard: All animals must have access to clean, free choice water that meets local and state water quality standards for sediment, pathogenic contaminants, and chemical pollutants.

Materials Needed: Brush, Calculator, Pliers, Screw Driver, Water Equipment Capacity Charts, Water Quality Standards, Water Requirements Charts for Dairy Cattle.

Enabling Objectives: Know how to read various charts.

Performance Guide:

1. Determine amount of water needed for animal
2. Determine the capacity of water units
3. Determine if water meets quality standards
4. Clean watering equipment of foreign matter
5. Inspect watering equipment for proper functioning
6. Provide clean free choice water

DUTY: H. PRODUCING FORAGES

TASK: 1. Design and Follow a Soil Conservation Plan

****

Performance Objective: Given materials listed below and access to alternatives for crop production and crop selection, design and follow a land use plan.

Standard: Land use plan must meet required conservation standards, have suitable crop selection and crop rotation to maximize production for the farm enterprise.

Materials Needed: Agricultural Stabilization Conservation Service, Budget Information, Crop Plan, Crop Record Book, Field and Soil Map, Livestock Plan, Soil Conservation Information, Soil Conservation Map, Soil Conservation Service.

Enabling Objectives: Know how to read maps.
Know the functions of ASCS and SCS.

Performance Guide:

1. Contact Soil Conservation Service
2. Register with Soil Conservation District
3. Obtain soil conservation map and determine:
    a. soil capabilities
    b. soil limitations
    c. conservation requirements
    d. cash crop production
    e. livestock feed production
4. Assess soil capabilities and requirements
5. Select the crops to be grown
6. Establish field layout and crop rotation plan
7. Request Soil Conservation Plan
8. Follow recommended plan

DUTY: H. PRODUCING FORAGES

TASK: 2. Prepare the Seedbed

****

Performance Objective: Given materials listed below and a proposed forage field, prepare a seedbed.

Standard: The seedbed must be free of foreign objects, smooth, and firm within the restrictions of available moisture.

Materials Needed: Chisel Plow, Cultipacker, Disc, Harrow, Moldboard Plow, Tractor.

Enabling Objectives: Know how to operate a tractor safely. Know how to adjust and operate tillage equipment.

Performance Guide:

1. Adjust and grease implements
2. Turn under all organic matter
3. Remove stones or excess trash from the field
4. Pulverize soil into small (but not fine) particles
5. Smooth seedbed

DUTY: H. PRODUCING FORAGES

TASK: 3. Plant forages

****

Performance Objective: Given materials listed below and a prepared seedbed, plant a forage.

Standard: Crop must be planted at the specified depth, time, and rate according to variety and species specifications.

Materials Needed: Broadcast Seeder, Cultipacker, Grain Drill, Grass Seeder, Harrow, Knife, No-till Seeder, Tractor, Tub.

Enabling Objectives: Know how to operate tractor safely.
Know how to adjust and operate planting equipment.

Performance Guide:

1. Determine the species, variety and amount of seed needed
2. Adjust planting equipment
3. Prepare seed
    a. apply lubricant
    b. apply innoculant
    c. mix with nurse or companion crop seed
4. Plant seed at specified depth

DUTY: H. PRODUCING FORAGES

TASK: 4. Control Diseases

****

Performance Objective: Given materials listed below and forage field, control diseases.

Standard: Disease problems must be controlled before or during an outbreak to maximize profits.

Materials Needed: Calculator, Gloves, Respirator, Sprayer, Tractor, Uniform.

Enabling Objectives: Know how to operate tractor safely.
Know how to calibrate sprayer and dusters.
Know symptoms of various diseases.

Performance Guide:

1. Determine local disease problems
2. Select method for disease control
    a. resistant varieties
    b. natural
    c. chemical
        (1) follow all instructions on the label
        (2) wear protective clothing and breathing apparatus
        (3) calibrate all sprayers and dusters
        (4) treat seed
        (5) treat plant
    d. harvest early
3. Check for disease control

DUTY: H. PRODUCING FORAGES

TASK: 5. Control Pests

****

Performance Objective: Given materials listed below and a forage field, control pests.

Standard: Pest problems must be controlled before or during an outbreak to maximize profits.

Materials Needed: Bucket, Butterfly net, Calculator, Gloves, Respirator, Sprayer, Tractor, Uniform.

Enabling Objectives: Know how to operate tractor safely.
Know how to calibrate sprayers and dusters.
Know how to identify various pests.

Performance Guide:

1. Determine local pest problems
2. Select method for pest control
    a. resistant variety
    b. natural
    c. chemical
        (1) follow all instructions on the label
        (2) wear protective breathing apparatus and clothing
        (3) calibrate all sprayers and dusters
        (4) treat seed
        (5) treat insect habitat
    d. harvest early
3. Take random collections to check results

DUTY: H. PRODUCING FORAGES

TASK: 6. Control Unwanted Plants

****

Performance Objective: Given materials listed below and a forage field, control unwanted plants.

Standard: Unwanted plants must be eliminated before going to seed.

Materials Needed: Bucket, Calculator, Coveralls, Gloves, Goggles, Hoe, Measuring Device, Mower, Respirator, Rubber Boots, Sprayer, Tractor.

Enabling Objectives: Know how to operate tractor safely.
Know how to calibrate sprayers.
Be able to identify unwanted plants.

Performance Guide:

1. Determine undesirable plants
2. Select method for control
    a. natural
    b. chemical
    c. physical
3. Empoy control method
    a. natural
    b. chemical
    c. physical
4. Check for presence of undesirable plants

DUTY: H. PRODUCING FORAGES

TASK: 7. Determine Harvest Time and Harvest Forages

****

Performance Objective: Given materials listed below and a field of forage, harvest the forage.

Standard: Forage must be cut at the recommended length and growth stage to insure a quality and yield that meet National Research Council Standards for that particular species.

Materials Needed: Baler, Forage Harvester, Moisture Tester, Mower Conditioner, Rake, Silo Blower, Tractor, Wagon.

Enabling Objectives: Know how to operate tractor safely.
Know how to adjust and operate forage harvesting equipment.

Performance Guide:

1. Determine growth stage
2. Adjust equipment
3. Lubricate equipment
4. Cut the forage
5. Collect the forage for storage

DUTY: H. PRODUCING FORAGES

TASK: 8. Store Forages

****

Performance Objective: Given materials listed below and a harvested forage, store the forage.

Standard: Forage must be preserved in a cost effective system that preserves maximum nutritive value.

Materials Needed: Hay Barn, Horizontal, Limited-oxygen Silo, Upright Silo.

Enabling Objectives: Have knowledge of various forage storage systems.

Performance Guide:

1. Select storage system based on:
    a. consultations with specialists
    b. forages handled
    c. unit desired
2. Maintain storage container
3. Place forage in container
4. Check for leaks or contamination
5. Maintain storage records

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 1. Remove or Add Ballast Weights to Tractor

****

Performance Objective: Provided a tractor, cast-iron or fluid ballast weights and the necessary equipment and tools, add the ballast weights to the tractor.

Standard: Added weight(s) must not exceed the amount of weight tractor tires should carry.

Materials Needed: Operator's Manual, Water or Calcium-Chloride Solution, Pump.

Enabling Objectives: None.

Performance Guide:

1. Determine maximum amount of added weight for tires
   CAUTION: Do not exceed maximum weight tractor tires should carry
2. Select method(s) of adding weights (fluid, cast-iron wheel or frame, or combination fluid-cast-iron)
3. To add fluid ballast weight:
   a. Pump water or calcium chloride solution into tire
      CAUTION: Do not fill tire above upper-rim level (approximately 75%)
4. To add cast-iron ballast weights:
   a. Bolt wheel weights to wheels
   b. Bolt frame weights to frame
5. Adjust tire pressure to accommodate weight change

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 2. Attach Farm Equipment to the Drawbar

****

Performance Objective: Provided a tractor and a piece of farm equipment, attach the piece of equipment to the tractor drawbar.

Standard: Attachment will be evaluated in accordance with one of the following:

PTO EQUIPMENT

1. Drawbar height adjusted between 13" and 17"
2. Drawbar length in EXTENDED HITCH position:
    a. 14" @ 540 RPM
    b. 16" @ 1000 RPM
3. Drawbar hitch centered directly under PTO shaft and secured
4. Universal joint positioned on PTO shaft and securely fastened

OTHER EQUIPMENT

1. Drawbar height adjusted between 13" and 17"
2. Drawbar length in CLOSE HITCH position
3. Drawbar allowed to swing freely

Materials Needed: Open end Wrenches, Box end Wrenches, Safety Hitch Pin.

Enabling Objectives: Know how to operate a tractor safely.
Know how to use hand tools properly.

Performance Guide:

1. Adjust drawbar height
2. Adjust drawbar length
    a. EXTENDED HITCH for PTO equipment
        (1) 14" @ 540 RPM
        (2) 16" @ 1000 RPM
    b. CLOSE HITCH for equipment not attached to PTO

****

3. Check lateral position of drawbar
    a. PTO equipment:
        (1) Center drawbar hitch point directly under PTO shaft and secure
    b. Other equipment:
        (1) Set drawbar swing freely
4. Back tractor into position so that hitch point in the drawbar is in line with the hole in the implement hitch
5. Set and lock tractor brakes
6. Disengage PTO
7. Turn tractor engine off
8. Attach implement to drawbar
9. Insert hitch pin

CAUTION: Do not try to put safety hitch pin in place from operator's seat while tractor is running and in gear.

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 3. Operate Equipment

****

Performance Objective: Given materials listed below, operate each piece of equipment.

Standard: All equipment will be operated according to instruction manual procedures.

Materials Needed: Tractor, Tillage Equipment, Forage Harvesting Equipment, Planting Equipment, Manure Spreading Blade Scraper, Post Hole Diggers, Rotary Mower (Shredder), Sprayer, Operators Manual.

Enabling Objectives: Know how to operate a tractor safely.

Performance Guide:

1. Observe the equipment for proper hitching
2. Check the equipment for adjustment
3. Correct the adjustment (if necessary)
4. Proceed to operate the equipment following operators manual procedures

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 4. Store Equipment

* * *

Performance Objective: Given materials listed below, prepare all equipment for storage.

Standard: All equipment will be prepared for off-season storage.

Materials Needed: Operator's Manuals, Cleaning Material, A Mechanic's Tool Set, Rust Preventative, Forage Equipment, Tillage Equipment, Other Equipment.

Enabling Objectives: Know how to operate tractor safely.

Performance Guide:

1. Clean equipment of foreign material
2. Select rust preventative
3. Apply rust preventative. Use solvent type (3 - 6 months) or soft grease type (10 - 12 months)
4. Place equipment in proper storage area

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 5. Perform Seasonal Preventative Maintenance

****

Performance Objective: Given the materials listed below, perform seasonal maintenance activities.

Standard: All items on the manufacturer's seasonal service list must be performed.

Materials Needed: Grease Gun, Mechanic's Tool Set, Manufacturer's Service Manual.

Enabling Objectives: Know how to read and interpret a service manual.

Performance Guide:

1. Locate the seasonal preventative maintenance instructions in the service manual
2. Perform all 10-, 50-, 100-, and 250-hour maintenance activities
3. Lubricate additional points referred to in the seasonal service list
4. Check adjustments of all items referred to in the seasonal list. Adjust if necessary
5. Clean all parts referred to in the seasonal list
6. Replace items as recommended by the manufacturer's service manual

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 6. Perform Daily Preventative Maintenance on Equipment

****

Performance Objective: Given the materials listed below, perform daily maintenance activities.

Standard: All items on the manufacturer's service list must be accomplished.

Materials Needed: Grease Gun, Mechanic's Tool Set, Manufacturer's Service Manual.

Enabling Objectives: Know how to read and use a service manual.

Performance Guide:

1. Locate the daily preventative maintenance instructions in the service manual
2. Lubricate all points listed
3. Check adjustments of all items listed. Make adjustments when necessary
4. Clean all items specifically identified for daily service
5. Check engine oil and hydraulic fluid levels, adjusting if necessary

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 7. Replace Universal Joints

****

Performance Objective: Given the materials listed below and a faulty universal joint, replace the universal joint.

Standard: The power transfer system must operate freely according to the operator's manual.

Materials Needed: New Universal Joint, Operator's Manual, Mechanic's Tool Set, Grease Gun.

Enabling Objectives: Know how to use basic hand tools.

Performance Guide:

1. Loosen set screws on universal joint
2. Slide universal joint off each shaft
3. Check operator's manual for size of new universal joint
4. Slide universal joint ends back onto shafts
5. Tighten set screws
6. Grease joint at grease fitting
7. Operate equipment and check for correct operation and alignment

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 8. Maintain Tires

****

Performance Objective: Given the materials listed below, maintain the tires.

Standard: All tires will be inflated to proper pressure to provide maximum service and traction.

Materials Needed: Tire/Wheel, Air Gauge, Air Compressor, Air Hoses, Service Manual.

Enabling Objectives: Know how to operate air compressor.
Know how to read air gauge.

Performance Guide:

1. Check the wheel for cuts and abrasions, nails, or other foreign objects
2. Check the tire pressure with the air gauge
3. Inflate the tire to proper pressure recommended in the service manual

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 9. Bleed Diesel Fuel System

****

Performance Objective: Given the materials listed below, bleed the fuel system.

Standard: All air must be removed from the system and no engine parts should be damaged. The engine must crank and run without excessive vibration upon completion of this task.

Materials Needed: Diesel Engine, Diesel Fuel, Mechanic's Tool Set, Manufacturer's Service Manual for the Engine.

Enabling Objectives: Know the parts of a diesel engine.
Know how to operate a diesel engine.

Performance Guide:

1. Determine the bleeding order recommended by the manufacturer from the service manual
2. Check fuel tank to be sure clean fuel is present
3. Be sure fuel shut-off valve, if applicable, is on
4. Locate filters, transfer pump, hand prime pump, bypass valve (if applicable), injection pump, and respective bleed plugs
5. Open the bleed plug on the filter nearest the tank (first stage filter)
6. Manually pump hand prime pump until clean fuel (without bubbles) flows out of bleed plug. Tighten bleed plugs
7. Open transfer pump bypass valve if applicable
8. Following the flow of fuel from tank to injectors, open the bleed plug of each filter, one at a time, and manually pump until you get fuel with no bubbles. Close each bleed plug before proceeding to additional filters
9. Bleed plugs at injector pump, if applicable, and close
10. Loosen the high pressure fuel line at each injector nozzle. Turn the engine over until clean fuel comes from each line. Retighten after bleeding.
11. Close transfer pump bypass valve, if applicable.
12. Crank engine.

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 10. Change Fuel Filters

****

Performance Objective: Given a tractor and the materials listed below, replace the fuel filter(s).

Standard: The fuel system will be free of air and water and there will be no leaks.

Materials Needed: Operator's Manual, Replacement Filter(s), Gasket(s), Open End Wrenches, Clean Rags, Catch Pan.

Enabling Objectives: Know how to use operator's manual.
Know how to operate tractor.

Performance Guide:

1. Turn off fuel supply
2. Drain fuel from filter
3. Remove old filter
4. Clean inside of filter bowl, if applicable
5. Install new filter element
6. Reassemble filter assembly
7. Tighten drain valve
8. Turn on fuel supply
9. Bleed system
10. Start engine and check for leaks

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 11. Change Oil and Oil Filter

****

Performance Objective: Provided a tractor with a by-pass or full-flow oil filtering system and the materials listed below, change the oil filter and oil.

Standard: When completed, there will be no oil leaks and the oil level will be at, but not exceed, the "FULL" mark on the oil dip stick.

Materials Needed: Replacement Filter, New Oil of Recommended Type and Grade, Draw Pan, Open-end Wrenches, Box-end Wrenches, Operator's Manual.

Enabling Objectives: Know how to operate tractor engine.
Know how to use operator's manual.
Know about the different types of oil systems.

Performance Guide:

NOTE: Oil should be drained and replaced when new filters are installed.

1. Operate engine until normal operating temperature is reached.
2. Stop engine.
3. Place container for old oil in position to catch oil.
4. Remove oil drain plug and clean, if necessary.
5. Allow crankcase to drain completely.
6. While crankcase oil is draining:
   a. Clean dirt from around oil filter area.
   b. Remove drain plug from filter base (if applicable) and catch oil in container.
   c. Loosen filter bowl or cover and remove.
   d. Remove old filter cartridge and discard.
   e. Clean inside of filter bowl and base with kerosene or diesel fuel, where applicable.
   f. Install new gasket.
   g. Install new oil filter unit.
   h. Replace filter bowl, if applicable, and tighten.
   CAUTION: Over tightening may cause gasket damage and result in oil leakage.

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 11. Change Oil and Oil Filter (Continued)

****

7. Replace crankcase drain plug and tighten.
8. Refill crankcase with new oil.
9. Start engine and let it run at low RPM for a few minutes.
10. Stop engine.
11. Check oil level on dip stick. Add oil to "FULL" line, if required.
    CAUTION: Do not exceed "FULL" line.
12. Dispose of used oil in a manner consistent with fire safety recommendations for stored fuel.

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 12. Flush and Clean Radiator

****

Performance Objective: Provided a tractor and the materials listed below, flush and clean the radiator.

Standard: The cleaned cooling system must show no evidence of dirty coolant or foreign materials and have no leaks.

Materials Needed: Operator's Manual, Flushing Compound or Cooling System Cleaner, Water Supply, Adjustable Pliers, Screwdriver, Protective Goggles.

Enabling Objectives: Know how to operate engine.
Know the parts and functions of the cooling system.

Performance Guide:

1. Run engine until thoroughly warm
2. Completely drain cooling system
3. Close drain
4. Refill cooling system with water
5. Add flushing compound or cleaner
6. Operate engine until normal operating temperature is reached
7. Check system for leaks
8. Drain cooling system
9. Refill system with water and coolant

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 13. Replace Thermostats

****

Performance Objective: Given a water cooled engine and the materials below, change the thermostat.

Standard: The engine must operate with the thermostat opening and closing properly.

Materials Needed: Mechanic's Tool Set, New Gasket, Replacement Thermostat.

Enabling Objectives: Know how to operate engine.
Know the parts and functions of the cooling system.

Performance Guide:

1. Drain coolant from engine and retain
2. Remove water hose clamp and work hose loose from thermostat cover
3. Remove thermostat cover bolts
4. Remove thermostat cover, gasket, and thermostat
5. Clean sealing surfaces of block and thermostat cover
6. Locate new thermostat in block
7. Apply gasket sealing compound to sealing surfaces
8. Locate new gasket
9. Replace cover, bolts and torque to recommended tightness
10. Reattach and clamp water hose
11. Replace coolant
12. Run engine and check for leaks

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 14. Replace Radiator Hoses

****

Performance Objective: Given an engine on which a radiator hose needs to be replaced, replace the hose.

Standard: The new hose must be routed so as not to kink and restrict water flow and must not leak when engine operates at normal speed and temperature.

Materials Needed: New Hose, Mechanic's Tool Set.

Enabling Objectives: Know how to operate engine.

Performance Guide:

1. Drain coolant from cooling system into a clean container.
2. Loosen clamps on hose to be replaced.
3. Pull, pry, or cut old hose away from fittings.
4. Clean all hose and foreign material from fittings.
5. Inspect old clamps and determine if they need to be replaced.
6. Slip one end of the new hose on the engine block.
7. Slide both clamps temporarily over the hose.
8. Slip the other end of the hose on the radiator fitting.
9. Locate clamps and tighten.
10. Replace coolant.
11. Operate engine and check for leaks.

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 15. Install V-Belts on Pulleys

****

Performance Objective: Given the materials listed below, install a V belt.

Standard: The belt must be aligned and at the tension recommended by the manufacturer.

Materials Needed: Belt Driven Machine, Mechanic's Tool Set, Replacement V-Belt.

Enabling Objectives: Know how to use measuring device.

Performance Guide:

1. Remove tension on pulleys and remove belt. Note the type of pulley as to width, depth, and design
2. Measure belt width and note part number on the belt
3. Match replacement belt to pulley type and length
4. Install belt
5. Tighten belt by adjusting to specified tension

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 16. Install and Adjust Pulleys on Motors

****

Performance Objective: Given the materials listed below, replace and adjust the pulley.

Standard: Equipment must operate without stress and wear on the belt and related parts.

Materials Needed: Pulley Drive, New Pulley, Service Manual, Mechanic's Tool Set, Pulley Puller.

Enabling Objectives: None.

Performance Guide:

1. Loosen set screw
2. Remove belt(s) as required
3. Place puller on pulley and remove it from shaft
4. Check service manual for correct size of pulley
5. Place new pulley on shaft
6. Align pulley
7. Tighten set screw
8. Replace belt(s) removed in Step 2 and adjust belt tension

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 17. Install Electric Motor

****

Performance Objective: Given the materials listed below, install an electric motor.

Standard: Install electric motor to obtain maximum efficiency in operation.

Materials Needed: Electric Motor, Mechanic's Tool Set.

Enabling Objectives: Restate the principle of electricity.
Restate the principles of electrical control systems.

Performance Guide:

1. Determine which motor needs replacing
2. Secure replacement according to specifications
3. Turn off power supply
4. Disconnect and remove old motor
5. Install replacement motor
6. Connect motor to power supply
7. Check wiring for OSHA and local code requirements
8. Test motor operation

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 18. Reverse Electric Motor

****

Performance Objective: Given the materials listed below, reverse the direction of shaft rotation on an electric motor.

Standard: The electric motor will rotate in the opposite direction.

Materials Needed: Electric Motor, Wiring Diagram, Screwdriver, Nut Driver Set.

Enabling Objectives: Know how to read and interpret diagrams.
Know electrical safety.

Performance Guide:

1. Identify the type of electric motor
2. Locate the wiring diagram on the electric motor
3. Be sure the power is disconnected from the motor
4. Change the wire leads to correspond with the wiring diagram
5. On repulsion-type electric motors:
    - a. Release the locking screw or spring clip that holds the ring
    - b. Rotate the brush ring to the alternate position
    - c. Relock the locking screw or spring clip
6. Reconnect the electric current to the motor

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 19. Service Electric Motors

****

Performance Objective: Given the materials listed below, service an electric motor.

Standard: Service an electric motor so that all dirt and dust is removed, and lubricate the motor as recommended by the manufacturer.

Materials Needed: Electric Motor, Cleaning Tools, Solvents.

Enabling Objectives: Understand the principles of electricity.

Performance Guide:

1. Review the operator's manual
2. Clean the housing of the motor before disassembling to clean the inside
3. Loosen and remove dust and foreign material with a soft brush or vacuum cleaner
4. Remove grease and oil with a safe solvent and a paint brush
5. Wipe it clean with a cloth
6. Examine the starting switch points and replace if burned or pitted
7. Reassemble motor after cleaned parts are dry
8. Lubricate bearings
9. Test the motor for proper operation

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 20. Install and Adjust Roller Chains

****

Performance Objective: Given the materials listed below, install and adjust roller chains.

Standard: Drive chain must transmit power from on rotating shaft to another without slippage. The links of the drive chain must mesh with the teeth of the sprockets and maintain a positive speed ratio between the driving and driven components. Drive chain and sprockets must be aligned, chain tension adjusted and the chain must be lubricated. Slippage, vibration and excessive noise must not be observed.

Materials Needed: Brush, Hammer, Solvent, Oil Can, Wrenches, Straight Edge, Lubricating Oil, Replacement Chain, Chain Detaching Tool, Chain Wear Limit Chart, Maintenance Instructions, Equipment Maintenance Manual.

Enabling Objectives: Recall hand tool safety.
Be able to read maintenance instructions.

Performance Guide:

1. Install drive chain on sprockets:
    A. Loosen the chain tighteners to provide slack
    B. Place chain in place and bring the ends of the chain together over one sprocket so teeth holds the chain in place
    C. Insert pin or pin link to couple chain together
    D. Place side plate on pins or put cotter key/retaining clip in place
    E. Adjust drive train tension:
        1. Identify type and location of chain tightener:
            a. Screw
            b. Gravity
            c. Spring
            d. Catenary
        2. Remove chain "slack":
            a. Horizontal and inclined drives should be about 1/4 inch per foot between shaft center (with one side of chain taut)

****

    b. Vertical drives and those subject to shock loading or reversal of rotation should be adjusted so that both spans of chain are almost taut
    c. For drives on fixed centers, chain tension is usually controlled by an adjustable chain tightener such as an idler sprocket or a shoe
    d. Estimate amount of chain sag by pulling one side of chain taut, allowing the excess chain to accumulate in the opposite span
    e. Place a straight edge on the slack span and pull the chain down at the center
    f. Measure sag from the top of chain to the underside of the straight edge
    g. Adjust tightener or shaft center to provide recommended amount of sag for proper chain slack
       CAUTION: Never attempt to adjust chains while the machine is running. Always shut off the machine prior to servicing

2. Install all chain guards and shields in place prior to operation
3. Lubricate the chain:
    A. Determine the method of lubrication:
        1. Manual:
            a. Brush or oil can
            b. Pressure lubricating
        2. Semi-automatic:
            a. Drip cup
        3. Automatic:
            a. Oil bath
            b. Oil dish
            c. Oil stream
            B. Apply lubricant
4. Run chain drive for a short period of time so oil warms and penetrates the gap between the inside and outside plates of roller chains

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 21. Install Engine Batteries

****

Performance Objective: Given a tractor, new battery and the materials listed below, replace the tractor battery.

Standard: The electrolyte level must be approximately 3/8" above the separators and the battery cable and hold down clamps tightened sufficiently to prevent battery movement.

Materials Needed: Electrolyte, Service Manual, Box-end Wrench Set, Battery Carrying Strap, Clamp Puller, Rags, Grease, Screw-driver, Battery Syringe.

Enabling Objectives: Know how to operate battery charger.

Performance Guide:

1. Remove battery from Box
2. Remove caps from battery cells
3. Fill battery cells with electrolyte
4. Slow charge the battery for 4-6 hours in well ventilated area
5. Turn off and remove charger when battery reaches full charge
6. Replace cell caps
7. Remove old battery from tractor
8. Clean battery cables and battery box
9. Place new battery in battery box
10. Tighten hold-down clamp
11. Connect positive cable
12. Connect ground cable
13. Test all connections for tightness
14. Apply thin layer of grease to battery posts and cable connections

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 22. Service Engine Batteries

****

Performance Objective: Given the materials listed below, perform routine service and maintenance operation on the battery.

Standard: All items on the Checklist must be rated acceptable.

Materials Needed: Battery, Mechanic's Tool Set, Battery Clamp Puller, Terminal Cleaning Brush, Sandpaper, Baking Soda, Light Grease, Distilled Water, Rags, Battery Syringe.

Enabling Objectives: Know how to use basic tools.

Performance Guide:

1. Inspect battery terminals, clamps, and cable connections for corrosion, looseness, or stripped bolts
2. Remove, clean and replace clamps if necessary. Install new clamps if the old ones cannot be refitted snugly
3. Clean corrosion, dirt and other foreign material from exterior surface of battery with a baking soda solution
4. Check battery mounting bracket for looseness and corrosion. Clean and/or tighten if needed
5. Remove cell caps
6. Check electrolyte level and fill to proper amount
7. Replace cell caps
8. Apply light coating of grease to battery terminals and clamps
9. Tighten clamps and connections

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 23. Service Wheel or In-Line Bearings

****

Performance Objective: Given the materials listed below, lubricate the wheel or in-line bearings.

Standard: The wheels or bearing must turn without friction, heat, and shock.

Materials Needed: Wheel and Wheel Bearing to be Lubricated, Jack, Wheel Puller, Mechanic's Tool Set, Grease, Rags, Cleaning Solvent.

Enabling Objectives: Know how to operate jack safely.
Know how to properly pack wheel bearing.

Performance Guide:

1. Chock vehicle
2. Jack-up wheel
3. Release brakes
4. Remove wheel, hub, and wheel bearings
5. Clean bearing in solvent
6. Pack wheel bearing with grease
7. Insert bearing on spindle or in hub
8. Install wheel and hub
9. Rotate wheel to check for excess drag or looseness

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 24. Maintain Tools

****

Performance Objective: Given the materials listed below, maintain the tools.

Standard: All hand tools will be cleaned and sharpened to maintain their condition.

Materials Needed: Hand Tools, Cleaning and Sharpening Equipment.

Enabling Objectives: Know the proper techniques for reconditioning of hand tools.

Performance Guide:

1. Remove debris from tools using scrapers or cleaning solvents
2. Secure hand tools in a vise when sharpening
3. Sharpen cutting edges until all gaps are removed and the original bevel is restored
4. Apply coating of lubricant for rust protection

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 25. Adjust Safety Shields

****

Performance Objective: Given tools and equipment listed below adjust safety shields.

Standard: All safety guards and shields will be in place and adjusted according to operators manual specifications.

Materials Needed: Tools, Operating Procedures, Safety Instructions, Guards-Shields, Equipment.

Enabling Objectives: Knowledge of safety procedures and function of guards and shields.

Performance Guide:

1. Check safety shields for proper adjustments
2. Loosen bolts holding safety shield
3. Move safety shields to proper positions
4. Retighten holding bolts
5. Recheck safety shields for proper adjustment

DUTY: I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

TASK: 26. Calibrate Equipment

****

Performance Objective: Given the materials listed below, calibrate the equipment.

Standard: Calibrate equipment to obtain the adjustment recommended in the operators manual.

Materials Needed: Equipment to be Calibrated, Measuring Devices.

Enabling Objectives: Calculated mathematical relationships associated with volume output, speed, pressure, and width of pattern.
Use computational and problem-solving skills in real-life situations with or without a calculator as appropriate.
Solve problems leading to proportions involving volume or weight.
Apply rates and percents in real-life situations.
Understand measurement systems, instruments, and techniques.

Performance Guide:

1. Check equipment for current adjustment
2. Determine the ground speed during operation
3. Determine the width of the equipment
4. Calculate the area covered per minute
5. Calculate the minutes needed to cover a given area
6. Calculate the area covered by the equipment

DUTY: J. MARKETING PRODUCTS AND ANIMALS

TASK: 1. Market Dairy Animals/Products

****

Performance Objective: Given the tools/equipment listed below and a dairy animal/product, market dairy animal/product.

Standard: Dairy animal/product must be marketed to produce maximum economic return to the farm enterprises.

Materials Needed: Calculator, Current Market Quotations and Market History, Livestock Costs and Budgets, Marketing Information.

Enabling Objectives: Know how to use calculator.
Know how to read and interpret marketing information.

Performance Guide:

1. Determine market goals and objectives
2. Calculate production costs
3. Calculate break-even information
4. Assess various marketing alternatives
5. Select marketing method consistent with economic information and goals
6. Produce for market requirements
7. Merchandise dairy animals/products

DUTY: J. MARKETING PRODUCTS AND ANIMALS

TASK: 2. Transport Animals

****

Performance Objective: Given tools/equipment listed below and dairy animals, transport animals.

Standard: All animals being transported must be loaded and moved without injury to the animal and handler.

Materials Needed: Loading Chute, Loading Dock, Rope Halter, Stock Cane, Stock Prod, Stock Trailer, Truck.

Enabling Objectives: Know how to safely operate truck and stock trailer.

Performance Guide:

1. Prepare for hauling
   a. Use safe and comfortable vehicles for transport
   b. Carry insurance on animals being hauled
   c. Avoid watering and feeding animals just prior (four to six hours) to hauling
2. Load animals
   a. Avoid excitement and stress
   b. Avoid abuse of stubborn animals
   c. Provide skid-free loading ramps, floors, or docks
3. Drive slowly while transporting
   a. Avoid sharp turns
   b. Avoid fast starts
   c. Avoid bumpy roads
   d. Avoid long delays
4. Stop and exercise animals every 18 hours on long hauls
5. Unload animals
   a. At animals' pace
   b. Allow time for animal to acclimate

DUTY: J. MARKETING PRODUCTS AND ANIMALS

TASK: 3. Verify Production Records

****

Performance Objective: Given tools/equipment listed below and production records, verify the production records.

Standard: All records must be verified by cross-checking between records of receipts and disbursements with records for breeding, pedigree, health, production, and maintenance.

Materials Needed: Breeding Records, Dairy Herd Improvement Association Records, Health Records, Maintenance Records, Pedigree Records, Production Records, Record of Monthly Expenses, Record of Monthly Receipts.

Enabling Objectives: Know how to read and interpret all records.

Performance Guide:

1. Audit all records quarterly
2. Compare total farm production against total farm costs and receipts
3. Compare milk production records with Dairy Herd Improvement Association records
4. Audit individual records randomly
5. Audit in greater detail if discrepancies are found

DUTY: K. HANDLING AND DISPOSING OF ANIMAL WASTE

TASK: 1. Manage and Remove Solid and Liquid Waste

****

Performance Objective: Given tools/equipment listed below and a waste disposal system for a dairy herd, manage the waste disposal system.

Standard: System must be free of odors, flies, leaks, and hazards.

Materials Needed: Grease Gun, Hammer, Mower, Nails, Wastes Sample Kit, Wire Nippers, Wire Strippers.

Enabling Objectives: None.

Performance Guide:

1. Check for foreign objects in waste-handling machinery
2. Grease and lubricate all bearings and gear boxes
3. Check electric motors for overheating
4. Control plant growth on lagoon banks
5. Control ground burrowing pests in lagoon banks
6. Inspect for storage leaks
7. Maintain fences around lagoons
8. Post "Keep Out" signs for safety
9. Take sample of waste affluent for microbial analysis by laboratory

DUTY: K. HANDLING AND DISPOSING OF ANIMAL WASTE

TASK: 2. Apply Wastes to Fields

****

Performance Objective: Given the materials listed below and collected dairy herd wastes, apply wastes to fields.

Standard: All wastes must be transported and applied in an efficient, cost-effective, and pollution-free manner.

Materials Needed: Agitation Device, Conventional Box-type Spreader, Front-end Loader, Irrigation and Pumping Equipment, Liquid Manure Injectors, Liquid Manure Pumps, Liquid Manure Spreader, Semi-solid Manure Spreaders, Tractor.

Enabling Objectives: Know how to operate tractor safely.

Performance Guide:

1. Apply liquid manure
    a. Tank spreader
    b. Irrigation system
2. Apply semi-solid manure
    a. Tank spreader
    b. Irrigation system
    c. Semi-solid manure spreader
3. Apply solid manure

DUTY: L. ASSIST IN SELECTING BREEDING ANIMALS

TASK: 1. Cull Animals

****

Performance Objective: Given the materials listed below and a dairy herd, cull animals.

Standard: All animals that are below farm production standards and whose temperaments are harmful to themselves, other animals and/or property must be culled.

Materials needed: Breeding Records, Classification/Type Scores, Health Records, Pedigree Records, Production Records/DHIA.

Enabling Objectives: Know how to interpret records.
Know how to use linear evaluation.

Performance Guide:

1. Select standards for culling
    a. Milk production
    b. Reproduction
    c. Pedigree
    d. Classification/type
    e. Poor disposition
    f. Sick or injured
2. Cull according to chosen criteria
3. Dispose of culled animals

DUTY: L. ASSIST IN SELECTING BREEDING ANIMALS

TASK: 2. Select Foundation Stock

****

Performance Objective: Given the materials listed below and a dairy herd, select foundation stock.

Standard: All animals selected must meet or exceed the farm standards for production, health, disposition and pedigree.

Materials Needed: Breeding Records, Health Records, Pedigree Records, Production Records/DHIA, Registration Papers, Show Records.

Enabling Objectives: Know how to interpret records.
Know how to use linear evaluation.

Performance Guide:

1. Select standards for appraisal
    a. Production history
    b. Breeding history
    c. Soundness and type
    d. Health history
    e. Disposition
    f. Genetic background
2. Select breeder(s) or sale
    a. Reputation
    b. Facilities
    c. History
3. Select animals
4. Acquire selected animals

DUTY: L. ASSIST IN SELECTING BREEDING ANIMALS

TASK: 3. Select Purchased and Self-Raised Replacement Stock

****

Performance Objective: Given the materials listed below and a dairy herd, select replacement stock.

Standard: All animals selected must meet or exceed the farm standards for production, health, disposition and pedigree.

Materials Needed: Breeding Records, Health Records, Pedigree Records, Production Records, Registration Papers, Show Records.

Enabling Objectives: Interpretation of Records.
Knowledge of visual appraisal.

Performance Guide:

1. Establish replacement plan
    a. number of animals needed per year
    b. number of on-farm animals available
    c. need for foundation stock
2. Select standards for appraisal
    a. production history
    b. breeding history
    c. soundness and type
    d. health history
    e. disposition
    f. genetic background
    g. growth
3. Select animals

DUTY: L. ASSIST IN SELECTING BREEDING ANIMALS

TASK: 4. Select Sires

****

Performance Objective: Given materials listed below and available sires, select herd sire(s).

Standard: All sires selected must meet or exceed current farm production, health, disposition and pedigree standards.

Materials Needed: Breeding Records, Classification/Type Score, Health Records, Pedigree Records, Progeny Records, Production Records, Registration Papers, Semen Quality Results, Show Records, Sibling Production Records.

Enabling Objectives: Knowledge of visual appraisal.
Understand Sire Summary Information.

Performance Guide:

1. Determine selection standards
    a. herd traits to be corrected
    b. proven tests on daughters
    c. repeatability of production in daughters
    d. type/classification of daughters equal to or better than herd average
    e. health records
    f. breeding records
    g. longevity records on progeny
    h. pedigree records
    i. semen quality
2. Consider recommendations of available mating programs
3. Select breeder
    a. reputation
    b. facilities
    c. history
4. Select bulls

DUTY: M. MAINTAINING BUILDINGS AND STRUCTURES

TASK: 1. Construct and Install Doors

****

Performance Objective: Given materials listed below construct a door for a farm building.

Standard: All doors must be square and neither bind nor allow excessive drafts.

Materials Needed: Bolts, Calculator, Carpenter's Square, Hammer, Hinges, Latch, Lumber, Nails, Rollers, Sandpaper, Saw, Tape Measure, Track.

Enabling Objectives: Know how to use basic carpentry tools.
Know how to determine a bill of materials.

Performance Guide:

1. Sketch a drawing for door(s)
2. Prepare a bill of materials with estimated cost
3. Assemble necessary raw materials
4. Measure and cut door parts
5. Frame door
6. Apply sheeting
7. Sand finished door
8. Paint the door
9. Install hardware
10. Hang door

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 2. Hang Sliding Doors

****

Performance Objective: Given the materials listed below, hang a sliding door.

Standard: The door will slide freely and evenly.

Materials Needed: Sliding door with frame assembly, Screwdriver, Level, Tape Measure.

Enabling Objectives: Know how to use a level.
Know how to use a tape measure.

Performance Guide:

1. Measure the opening for size
2. Install the sliding door assembly
3. Level the assembly
4. Fasten the assembly to the wall frame
5. Recheck the levelness
6. Open and close the door to check movement

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 3. Hang Hinged Doors

****

Performance Objective: Given the materials listed below, hang a hinged door.

Standard: The hinged door will swing level and have no cracks or gaps when closed.

Materials Needed: Door, Hinges, Wedges, Saw, Measuring Tape, Square, Wood Chisel, Screws, Screwdriver.

Enabling Objectives: Know how to use carpentry tools.

Performance Guide:

1. Measure and mark the door for width and height
2. Cut the door to size
3. Place the door in the opening and put wedges under it to raise it for clearance. Allow 1/8" clearance at top and on sides and 1/4" on bottom. (7/8" for carpeting)
4. Locate hinges 6 to 7 inches from the top and 10 or 11 inches from the bottom
5. Mark their position on the door and jamb with a wood chisel
6. Cut mortises for hinges
7. Attach hinge to door
8. Hold in place and attach to door jamb

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 4. Paint Wood Surfaces

****

Performance Objective: Given materials listed below and a wood surface such as a fence post or runner and the necessary supplies equipment, apply paint.

Standard: The application must be evenly applied and cover all surfaces.

Materials Needed: Clean Brushes, Cleaning Materials, Paint, Brushes or Sprayer for Application.

Enabling Objectives: Knowledge of proper painting procedures.
Knowledge of proper clean-up procedures.

Performance Guide:

1. Inspect surface to be painted
2. Clean the surface
3. Select and prepare the paint
4. Apply paint
5. Apply finish, if applicable
6. Clean brushes and other equipment

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 5. Paint Metal Surfaces

****

Performance Objective: Given the materials listed below and provided a metal surface (structure or machine) which requires painting and the necessary supplies and equipment, clean the surface and apply the metal paint.

Standard: The surface must be free of grease, dirt and rust and the application must completely cover the surface.

Materials Needed: Steam Cleaning Machine (optional), Sandpaper, Scraper, Wire Brush, Cleaning Solvent (rust-removing), Primer, Paint, Paint Brushes, Paint Sprayer.

Enabling Objectives: Knowledge of proper painting procedures.
Knowledge of proper clean-up procedures.

Performance Guide:

1. Inspect the metal surface to determine extent of treatment needed
2. Select required materials:
   a. cleaning solvents
   b. brushes, sandpaper, etc.
   c. paint brush or spray
   d. primer and paint
3. Clean the surface:
   a. remove old finish
   b. remove all dirt, grease and rust
4. Apply rust-inhibiting primer coat
5. Apply finish coat
6. Clean brushes and sprayer

DUTY: M. MAINTAIN BUILDING AND STRUCTURES

TASK: 6. Apply Creosote or Other Wood Preservatives

****

Performance Objective: Given the materials listed below and a wood surface such as a fence post or runner and the necessary supplies and equipment, apply wood preservatives.

Standard: The application must be evenly applied and cover all surfaces.

Materials Needed: Clean Brushes, Cleaning Materials, Preservative, Brushes or Sprayer for Application.

Enabling Objectives: Know safety involved in handling preservatives.
Knowledge of proper painting procedures.
Knowledge of proper clean-up procedure.

Performance Guide:

1. Inspect surface to be treated
2. Clean the surface
3. Select and prepare preservative
4. Apply preservative
5. Apply finish, if applicable
6. Clean brushes and other equipment

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 7. Patch Roofs

****

Performance Objective: Given materials listed below and a leaking roof, patch a roof.

Standard: Patched roofs must not leak.

Materials Needed: Hammer, Hatchet, Ladder, Metal Roofing, Nails, Sealant, Shingles, Tape Measure, Tin Snips, Wire Brush.

Enabling Objectives: Know how to use basic carpentry tools.
Know how to prepare a bill of materials.

Performance Guide:

1. Determine area of damage
2. Determine repair
3. Prepare a bill of materials with estimated cost
4. Procure necessary raw materials
5. Trim out damaged area
6. Clean around damaged area
7. Install replacement material
8. Apply sealant
9. Check for leaks

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 8. Install Window Panes

****

Performance Objective: Given materials listed below and a broken window, install a window pane.

Standard: All panes must be secure, leak proof, and with trim replaced.

Materials Needed: Glass Cutter, Hammer, Nails, Pane Retainers, Putty Knife, Tape Measure, Window Glass, Window Putty (Caulking Compound).

Enabling Objectives: Know how to use glass working tools.

Performance Guide:

1. Remove trim and pane retainers
2. Remove damaged pane
3. Clean pane frame
4. Cut replacement pane to fit
5. Position pane in frame
6. Install pane retainers
7. Apply putty to seal the pane
8. Replace trim
9. Paint frame and trim if necessary
10. Check for leak

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 9. Weld Metal Using Arc Welder

****

Performance Objective: Given the materials listed below and provided arc welding equipment and supplies and two pieces of steel, arc weld the steel pieces together at right angles using fillet and groove welds.

Standard: The completed weld will show:

a. smooth and continuous welds.
b. complete penetration.
c. fusion between the weld bead and base metal.
d. no cracks, undercutting or overlap.

Materials Needed: Welding Helmet and Goggles, Gloves.

Enabling Objectives: Know the basic principles of arc welding.

Performance Guide:

1. Select safety equipment
2. Arrange tools and materials
3. Set up equipment
4. Clean and position metal for welding
5. Turn on and adjust welding machine
6. Weld joints using fillet and groove welds

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 10. Weld Metal Using Oxy-Acetylene Unit

****

Performance Objective: Given the materials listed below weld two pieces of 16 gauge metal together.

Standard: The completed weld will show:

a. smooth and continuous welds.
b. complete penetration.
c. fusion between the weld bead and base metal.

Materials Needed: 2 16 Gauge Pieces of Metal, Oxygen Cylinder, Acetylene Cylinder, Oxygen and Acetylene Hose Connections, Torch Blowpipe, Welding Tips, Approved Safety Glasses and Shield.

Enabling Objectives: Know the safety requirements of using oxy-acetylene equipment.
Know how to turn on and adjust the torch.

Performance Guide:

1. Select safety equipment
2. Arrange tools and materials
3. Set up equipment
4. Clean and position metal for welding
5. Turn on and adjust oxy-acetylene torch
6. Tack two pieces of metal at each end
7. Weld the joints using fillet welds

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 11. Cut Metal Using Oxy-Acetylene Unit

****

Performance Objective: Given the materials listed below and a provided piece of ferrous metal, cut the metal (straight-line) with an oxy-acetylene torch.

Standard: The edge of the cut must be square and the draglines vertical and not too pronounced.

Materials Needed: Oxygen Cylinder, Acetylene Cylinder, Oxygen and Acetylene Hose Connections, Cutting Torch, Cutting Torch Tips, Approved Safety Glasses and Shield.

Enabling Objectives: Know safety requirements of using oxy-acetylene equipment.
Know how to turn on and adjust the torch.

Performance Guide:

1. Draw cutting line on metal
2. Light and adjust preheating flame
3. Hold cutting tip over edge of metal (vertical centerline of top should be square and in line with edge of metal)
4. When edge of metal is bright red, turn on cutting oxygen
5. With cutting tip square with work, cut along premarked line

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 12. Construct and Maintain Wooden Fence

****

Performance Objective: Given materials listed below and an area needing fenced, construct a wooden fence.

Standard: All wooden fences must meet design specifications for spacing, height, rigidity, post placement and restrict the animals specified.

Materials Needed: Calculator, Carpenter's Level, Carpenter's Square, Chain Saw, Cord, Crow Bar, Hammer, Lumber, Nails, Post Driver, Post Hole Digger, Saw, Tamper, Tape Measure.

Enabling Objectives: Know how to use basic carpentry tools.
Know how to figure a bill of materials.

Performance Guide:

1. Sketch drawing of fence
2. Prepare a bill of materials with estimated cost
3. Procure necessary raw materials
4. Mark location of post holes
5. Drill/dig post holes if necessary
6. Set or drive posts
7. Cut fencing boards
8. Attach boards
9. Cut post tops level
10. Paint fence
11. Check finished product against design standards

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 13. Construct and Maintain Wire Fence

****

Performance Objective: Given materials listed below and an area needing fenced, construct a wire fence.

Standard: All wire fence must meet design specifications for height, post placement, tension and restrict the animals specified.

Materials Needed: Barbed Wire, Calculator, Carpenters Level, Corner Post Anchor, Hammer, Nails, Posts, Post Driver, Post Hole Driver, Spade, Tamper, Tape Measure, Wire Nipper, Wire Stretchers, Woven Wire.

Enabling Objectives: Know how to use basic carpentry tools.
Know how to figure a bill of materials.

Performance Guide:

1. Sketch drawing of fence
2. Prepare a bill of materials with estimated cost
3. Procure necessary raw materials
4. Mark location of post holes
5. Drill/dig post holes if necessary
6. Set or drive posts
7. Install corner or line brace
8. Stretch and attach wire
9. Check finished fence against design standards

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 14. Construct and Maintain Electric Fence

****

Performance Objective: Given materials listed below and an area needing fenced, construct a electric fence.

Standard: The electric fence must be at a specified height, have current pass through it unobstructed and restrict the animals specified.

Materials Needed: Calculator, Electric Fencing Posts, Electric Fencing Wire, Hammer, Iridescent Tape, Insulators, Insulator Wire Clips, Pliers, Tape Measure.

Enabling Objectives: Know how to use basic carpentry tools.
Know how to determine a bill of materials.

Performance Guide:

1. Sketch drawing of fence
2. Prepare a bill of materials with estimated cost
3. Procure necessary raw materials
4. Set posts
5. Install insulators
6. Attach wire and reflector
7. Install gate insulator
8. Install electric charger
9. Energize fence
10. Test for current

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 15. Construct and Maintain Gates

****

Performance Objective: Given materials listed below and an opening in a fence, construct a gate.

Standard: All gates must be square and open/close without binding of dragging.

Materials Needed: Bolts, Calculator, Carpenter's square, Hammer, Hinges, Latch, Lumber, Nails, Saw, Screws, Tape Measure, Wire Snipper.

Enabling Objectives: Know how to use basic carpentry tools.
Know how to prepare a bill of materials.

Performance Guide:

1. Wooden gate
    a. measure the opening
    b. sketch drawing of gate
    c. prepare bill of materials with estimated cost
    d. procure necessary materials
    e. cut boards to fit
    f. assemble gate
    g. attach hardware
    h. paint gate
    i. hang gate
    2. Wire gate
    a. measure the opening
    b. cut stakes
    c. cut wire (barbed or woven)
    d. stretch and attach wire to stakes

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 16. Hang Gates

****

Performance Objective: Given materials listed below, hang a gate.

Standard: When attached, the gate must swing freely and must not sag.

Materials Needed: Lumber, Saw, Drill, Hammer, Bolts, Wrench, Hinges, Latch, Cable.

Enabling Objectives: Know how to use basic carpentry tools.

Performance Guide:

1. Study plans to determine requirements
2. Install hinges
3. Install latch
4. Install cable for support
5. Attach gate to post

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 17. Wire Simple Electric Circuits

****

Performance Objective: Given materials listed below, install a wiring system.

Standard: The system must meet the standards of the National Code and Plan specifications.

Materials Needed: Set of Electrician's Tools, Wire, Electrical Supplies, and a Plan.

Enabling Objectives: Know basic safety associated with electricity.
Know the basics of electric wiring.

Performance Guide:

1. Make a bill of materials
2. Purchase materials
3. Install wiring
    a. Install circuit breaker
    b. Install 110-circuit
        1. Install lights
        2. Install light switches
        3. Install base plugs

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 18. Connect Electric Switch

****

Performance Objective: Given materials listed below, connect a single pole electrical switch.

Standard: All electrical connections must be mechanically secure and there must be no arcing when the switch is turned ON and/or OFF.

Materials Needed: Screwdrivers, Electrician's Pliers, Single Pole Switch.

Enabling Objectives: Know basic safety associated with electricity.
Know the basics of electric wiring.

Performance Guide:

1. Turn off electrical power of circuit
2. Remove face plate
3. Remove switch from receptacle
4. Remove wires from switch
5. Connect hot wire to positive pole on new switch
6. Connect white wire to ground pole on new switch

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 19. Connect Lighting Fixture

****

Performance Objective: Given materials listed below, replace a lighting fixture.

Standard: All electrical connections must be mechanically secure and there must be no arcing when the switch is turned ON and/or OFF.

Materials Needed: Screwdrivers, Electrician's Pliers, Lighting Fixture.

Enabling Objectives: Know basic safety associated with electricity.
Know the basics of electric wiring.

Performance Guide:

1. Turn off electrical power to circuit
2. Remove light bulbs
3. Remove fixture from box
4. Remove wires from fixture
5. Connect hot wire to black wire on new fixture
6. Connect white wire to white wire on new fixture
7. Connect green wire to ground wire on new fixture

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 20. Attach Plug and Receptacle to Electrical Drop Cord

****

Performance Objective: Given materials listed below, attach a plug and receptacle to an electrical cord drop.

Standard: All electrical connections must be mechanically secure and there must be no arcing when the cord is plugged in.

Materials Needed: Screwdrivers, Electrician's Pliers, 50' of Electrical Cord, Plug, Electrical Receptacle, Receptacle Box with Clamp, Duplex Cover Plate.

Enabling Objectives: Know basic safety associated with electricity.
Know the basics of electric wiring.

Performance Guide:

1. Strip wires on both ends of cord for approximately 3/4"
2. Attach plug to one end of cord following proper procedures
3. Run cord through duplex receptacle box clamp approximately 3 to 4 inches and tighten clamp around cord
4. Attach duplex receptacle to electrical cord
5. Attach duplex receptacle to receptacle box
6. Place and attach cover plate to receptacle
7. Plug in extension cord and test

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 21. Replace Fuses

****

Performance Objective: Given materials listed below, replace a fuse.

Standard: All electrical connections must be mechanically secure and the fuse must maintain current in the circuit.

Materials Needed: Screwdrivers, Electrician's Pliers, Various Size Fuses, Fuse Box.

Enabling Objectives: Know basic safety associated with electricity.
Know the basics of electric wiring.

Performance Guide:

1. Turn off electrical power to circuit
2. Remove old fuse
3. Select the proper size fuse
4. Place new fuse in fuse box
5. Restore power to circuit and test circuit for proper operation

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 22. Reset Circuit Breakers

****

Performance Objective: Given materials listed below, reset a circuit breaker.

Standard: All electrical connections must be mechanically secure and the breaker must maintain current in the circuit.

Materials Needed: Screwdrivers, Electrician's Pliers, Breaker Box with Circuit Breakers.

Enabling Objectives: Know basic safety associated with electricity.
Know the basics of electric wiring.

Performance Guide:

1. Check breaker box to determine which breaker has been thrown
2. Reset circuit breaker
3. Check circuit for proper operation

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 23. Maintain a Water System

****

Performance Objective: Given materials listed below and a water system, maintain the water system.

Standard: All water systems must supply a constant water volume and pressure for a specified size of pipe, pump and available water source.

Materials Needed: Blow Torch, Copper Tube Cutter, Copper Tube Flare, Cutting Oil Can, Galvanized Pipe Cutter, Joint Sealer, Open-End Adjustment Wrench, Pipe Vise, Pipe Wrench, Screwdriver, Thread Cutter (Pipe Die).

Enabling Objectives: Know the procedure for using various plumbing tools.

Performance Guide:

1. Inspect water source for sufficient quantity
2. Inspect pump, wiring and switches for serviceability
3. Correct electrical deficiencies as needed
4. Inspect the pressure tank, gauges, and values for correct operation
5. Inspect line
6. Inspect specialized equipment
    a. chlorine dispenser
    b. filter
    c. water softener
7. Correct plumbing deficiencies
8. Schedule a plumber for complex deficiencies
9. Replace faucets
10. Replace faucet washers
11. Install water pipes as needed

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 24. Pour Concrete Floor

****

Performance Objective: Given materials listed below and an area needing a concrete floor, pour a concrete floor.

Standard: All concrete floors must meet design specifications for surface texture, strength (per sq. ft.) and composition.

Materials Needed: Bolt Cutter, Broom, Concrete Level Device, Float, Forms, Hammer, Hatchet, Level, Nails, Pliers, Saw, Shovel, Tape Measure, Wheel Barrow.

Enabling Objectives: Know how to determine volume of concrete needed.
Know the proper procedure for setting forms, placing reinforcement materials, finishing concrete, and curing concrete.
Know how to perform a slump test.

Performance Guide:

1. Determine strength of concrete needed
2. Determine volume needed
3. Construct forms or set grade stakes
4. Place and level base material
5. Place reinforcement material in place
6. Purchase readi-mix or mix concrete
7. Perform slump test
8. Pour and level wet concrete
9. Float and finish the surface
10. Allow to cure
11. Remove forms and cover

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 25. Construct Block Walls

****

Performance Objective: Given materials listed below, construct a block wall.

Standard: The wall must be straight, level, and plumb and must meet plan specifications.

Materials Needed: Cement Mixer, Mortar Trowel, Blocks, Mortar Mix, Plumb Line, Level, Construction Plans, Water, Sand, Chalk Line.

Enabling Objectives: Know how to lay blocks following standard procedure.
Know how to use a level and plumb line.

Performance Guide:

1. Place mortar mix, sand, and water in cement mixer according to correct ratios.
2. Mix thoroughly with concrete mixer
3. Lay out wall with chalk line
4. Apply base layer of mortar
5. Build corners
6. Use plumb line on corners to lay stretcher blocks in wall
7. Check levelness and plumbness on each layer
8. Clean tools when finished

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 26. Extinguish Fires

****

Performance Objective: Given materials listed below and a fire, extinguish the fire.

Standard: All fires must be extinguished.

Materials Needed: Blanket, Fire Extinguisher, Gloves, Hard Hat, Sand.

Enabling Objectives: Know how to use fire extinguisher.

Performance Guide:

1. Contact Fire Department with accurate information
2. Asses danger factors for people and property
3. Determine type/class of fire
4. Use extinguish device
    a. Reduce critical combustion temperature
    b. eliminate fuel source
        (1) oxygen
        (2) combustible material
5. Assess cause and damage

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 27. Maintain Ventilation Equipment in Dairy Barns

****

Performance Objective: Given materials listed below and a dairy barn ventilation system, maintain the ventilation equipment in dairy buildings.

Standard: The ventilation system of a building must maintain a temperature of not greater than 75 F + or -10 degrees and a humidity of not greater than 55% + or - 10 percentage points.

Materials Needed: Clean Rags, Oil Can, Open-end Wrench, Pliers, Screwdriver.

Enabling Objectives: Know how to use basic tools.

Performance Guide:

1. Locate ventilation fan(s)
2. Check electric motor(s) for overheating
3. Check belts(s) for fraying or tension
4. Test thermostat for accuracy
5. Test humidistat for accuracy
6. Clean fan blades, grill or louvers
7. Test fan and louvers for freedom of operation

DUTY: M. MAINTAIN BUILDINGS AND STRUCTURES

TASK: 28. Paint Buildings

****

Performance Objective: Given materials listed below and a building to be painted, paint the building.

Standard: All surfaces must be completely covered and the paint must not sag or run.

Materials Needed: Paint Mixer, Brush, Roller or Spray Gun, Paint, Scraper/Sand Paper/Paint Remover, Air Compressor, Ladder.

Enabling Objectives: Know how to estimate amount of paint needed. Know how to operate spray equipment.

Performance Guide:

1. Determine kind of paint suited for use intended
2. Estimate amount of paint needed
3. Prepare surface
4. Mix paint
5. Apply paint with brush, roller or spray gun
6. Clean equipment

DUTY: N. MANAGING HAZARDOUS MATERIALS

TASK: 1. Storing Hazardous Materials

****

Performance Objective: Given materials listed below, store the hazardous materials according to chemical specifications.

Standard: All hazardous materials will be stored according to manufacturers and USDA standards.

Materials Needed: Hazardous Material Container, Material Data, Storage Instruction, Safety Equipment Relating to Material.

Enabling Objectives: Know the dangers involved with improper storage of hazardous materials.

Performance Guide:

1. Read the material data
2. Read the storage instructions on the container
3. Use proper safety handling equipment
4. Check all containers for leakage
5. Store hazardous materials according to instructions

DUTY: N. MANAGING HAZARDOUS MATERIALS

TASK: 2. Using Hazardous Materials

****

Performance Objective: Given materials listed below and hazardous materials, use the materials.

Standard: All hazardous materials, will be used according to manufacturers specifications.

Materials Needed: Equipment for Hazardous Materials, Hazardous Materials, Chemical Gloves, Goggles, Respirator.

Enabling Objectives: Know how to handle and use hazardous materials according to label instructions.

Performance Guide:

1. Read the directions for use of the hazardous materials
2. Dress in hazardous material handling equipment
3. Prepare the hazardous materials for use
4. Apply the hazardous materials according to directions
5. Clean up the equipment
6. Store according to directions

DUTY: N. MANAGING HAZARDOUS MATERIALS

TASK: 3. Disposing of Hazardous Materials

****

Performance Objective: Given the materials listed below. dispose of hazardous materials.

Standard: Hazardous material will be disposed of in a safe manner which meets State and Federal Regulations.

Materials Needed: Hazardous Materials, Disposal Site, Safety Equipment.

Enabling Objectives: Know materials which are hazardous.
Know regulations dealing with hazardous materials.

Performance Guide:

1. Determine which materials are hazardous
2. Dress with safety equipment
3. Check directions for disposal
4. Dispose of hazardous materials according to State and Federal Regulations

DUTY: N. MANAGING HAZARDOUS MATERIALS

TASK: 4. Managing Dioxins

****

Performance Objective: Given materials listed below, handle, use and store dioxins.

Standard: All dioxins will be handled and used and stored according to manufacturers recommendations and State and Federal Guidelines.

Materials Needed: Proper Equipment and Storage Facilities for Handling Dioxin, Instruction Concerning Products.

Enabling Objectives: Knowledge of proper handling and use of materials containing dioxins.

Performance Guide:

1. Read the instructions for the dioxin materials
2. Dress in proper handling equipment
3. Prepare the dioxin materials according to manufacturers specifications.
4. Use the dioxin materials
5. Store the dioxin materials according to standards
6. Clean up equipment
7. Dispose of dioxin materials according to manufacturers and State and Federal Regulations

6. Clean up equipment
7. Dispose of dioxin materials according to manufacturers and State and Federal Regulations

DUTY: O. MANAGING THE BUSINESS

TASK: 1. Maintain Health Records on Dairy Animals

****

Performance Objective: Given materials listed below and dairy herd health information, maintain all health data.

Standard: All records must be accurate and up-to-date.

Materials Needed: Breed Records, Health Records, Veterinarian Bills.

Enabling Objectives: Know how to keep records.

Performance Guide:

1. Initiate animal's health record at birth or acquisition
2. Record animal's identity
3. Record management treatments
   a. dehorning
   b. extra teat removal
   c. hoof trimming
   d. identifying marks or tags
   e. vaccinations
   f. parasite treatments
   g. calving and reproduction problems
   h. mastitis treatments
   i. magnet implanting
4. Record disease or injury treatments
   a. diagnosis
   b. medicine administered
   c. prognosis
   d. veterinarian consulted
5. Record death or sale information

DUTY: O. MANAGING THE BUSINESS

TASK: 2. Inventory Supplies

****

Performance Objective: Given materials listed below and storage units, prepare inventory of supplies.

Standard: The completed inventory must be in agreement with marketing and harvesting records and the recorded expenses for supplies.

Materials Needed: Calculator, Inventory and Crop Record Forms, Measuring Tape, Monthly Farm Records, Price Lists, Tables for Estimating Physical Amounts of Crops in Storage.

Enabling Objectives: Know how to use calculator.
Know how to record and interpret farm records.

Performance Guide:

1. List all supplies on hand for a given date
2. Determine dollar value of supplies
3. Calculate present content of storage units
4. Determine the dollar value of harvested crop
5. Record the inventory

DUTY: O. MANAGING THE BUSINESS

TASK: 3. Maintain Animal Production Records

****

Performance Objective: Given materials listed below and production records, maintain the production records.

Standard: All records must be maintained by cross-checking between records of receipts and disbursements with records for breeding, pedigree, health, production, maintenance.

Materials Needed: Breeding Records, Dairy Herd Improvement Association Records, Health Records, Maintenance Records, Pedigree Records, Production Records, Record of Monthly Expenses, Record of Monthly Receipts.

Enabling Objectives: Know how to read and interpret record keeping system.

Performance Guide:

1. Record all information daily or weekly
2. Audit all records quarterly
3. Compare total farm production against total farm costs and receipts
4. Compare milk production records with Dairy Herd Improvement Association records
5. Audit individual records randomly
6. Audit in greater detail if discrepancies are found

DUTY: O. MANAGING THE BUSINESS

TASK: 4. Maintain Pedigree Records

****

Performance Objective: Given materials listed below, maintain pedigree records.

Standard: All records will be accurate and up-to-date.

Materials Needed: Accounting Records, Breeding Records, Dairy Herd Improvement Association Records, Health Records, Pedigree Registration Certificate, Pocket Record Book, Production Records.

Enabling Objectives: Know how to read and interpret record keeping systems.

Performance Guide:

1. Record all information monthly
2. Audit all records quarterly
3. Compare all records against DHIA records and pedigree registration certificates
4. Audit individual records randomly
5. Audit in greater detail if discrepancies are found

DUTY: O. MANAGING THE BUSINESS

TASK: 5. Maintain Equipment Records

****

Performance Objective: Given materials below and equipment maintenance data, maintain equipment records.

Standard: All equipment must be identified with records on maintenance and repairs accurate and up-to-date.

Materials Needed: Accounting Records, Equipment Record Book, Operator's Manual, Warranty Certificate.

Enabling Objectives: Know how to read and interpret operators manual.
Know how to read and interpret warranty certificate.

Performance Guide:

1. Engrave all equipment with identification mark
2. Record periodic maintenance activities
3. Record and submit warranty papers
4. Record depreciation schedules
5. Record original and repair costs

DUTY: O. MANAGING THE BUSINESS

TASK: 6. Maintain Forage Production Records

****

Performance Objective: Given materials listed below and forage production data, maintain forage production records.

Standard: All soil and crop records must be accurate and up-to-date.

Materials Needed: Chemical Bill, Fertilizer Bill, Permanent Crop Record, Pocket Record Book, Seed Bill, Seed Tag, Soil Test Report.

Enabling Objectives: Know how to read and interpret soil test reports.

Performance Guide:

1. Record soil test information
2. Record crop inputs
3. Record yield data

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 1. Calculate Interest Costs

****

Performance Objective: Given materials listed below and access to farm records, calculate and record interest costs for a year.

Standard: Calculations and recordings must accurately reflect interest costs for the farm business.

Materials Needed: Agriculture Finance Publications, Calculator, Complete Farm Records, Farm Records Summary.

Enabling Objectives: Know how to use a calculator.
Know how to read and interpret farm records.
Know how to calculate interest.

Performance Guide:

1. Determine interest ratio for farm borrowing
2. Estimate borrowing needs for current year
3. Calculate interest costs for the year
4. Record data

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 2. Formulate Feasible Repayment Schedule

****

Performance Objective: Given materials listed below and access to farm records, formulate a feasible repayment schedule for a year.

Standard: Calculations and recordings must accurately reflect a repayment schedule for the farm business.

Materials Needed: Agriculture Finance Publications, Calculator, Complete Farm Records, Farm Records Summary.

Enabling Objectives: Know how to read and interpret farm records.

Performance Guide:

1. Determine farm receipts and operating expenses for the year
2. Use the cash flow budget to determine needs
3. Formulate a repayment schedule for the farm business

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 3. Prepare a Cash Flow Budget for the Dairy Enterprise

****

Performance Objective: Given materials listed below and a blank cash flow statement form and current financial data, prepare a cash flow budget for the dairy enterprise.

Standard: The cash flow budget will show total income, total expenditures and the cash difference without error.

Materials Needed: Current Financial Data to Include Source(s) and Amounts of: Operating Income, Capital Sales, Non-Farm Income, Operating Expense, Capital Expenditures, Other Expenditures, Calculator.

Enabling Objectives: Know how to read and interpret farm records. Know how to use calculator.

Performance Guide:

NOTE: Include only cash transactions that have occurred

1. Enter source(s) and amounts of operating income
2. Total operating income
3. Enter source(s) and amounts of capital sales
4. Total capital sales
5. Enter source(s) and amounts of non-farm income
6. Total non-farm income
7. Enter source(s) and amounts of operating expenses
8. Total operating expenses
9. Enter source(s) and amounts of capital expenditures
10. Total capital expenditures
11. Enter source(s) and amounts of other expenditures
12. Total other expenditures
13. Total all income
14. Total all expenditures
15. Calculate each difference between total income and total expenditures

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 4. Develop and Negotiate a Credit Plan for the Farm Business

****

Performance Objective: Given materials listed below, develop and negotiate a credit plan for the farm business.

Standard: Instructor must be satisfied that amount of credit is justified and loan repayment is within cash flow ability of the farm enterprise.

Materials Needed: Agricultural Credit Publications, Calculator, Cash Flow Statement, Comparative Trend Analysis Sheet, Net Worth Statement, Profit/Loss Statement.

Enabling Objectives: Know how to complete various financial statements.

Performance Guide:

1. Determine need for credit plan for farm business
2. Complete the following financial statements:
    a. Net Worth Statement
    b. Profit/Loss
    c. Cash Flow Statements
    d. Comparative Standard Analysis Sheet
3. Identify items for which credit will be needed
4. Assess providers of lending services
5. Select provider of lending service
6. Develop credit plan for the farm business
7. Negotiate credit

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 5. Calculate and Record Assets

****

Performance Objective: Given materials listed below, calculate and record assets.

Standard: Instructor must confirm that calculations and recordings measure farm assets at market value.

Materials Needed: Calculator, Complete Farm Business Financial Records, Inventories, Microcomputer, Financial Statement, Software Programs.

Enabling Objectives: Know the different kinds of assets.

Performance Guide:

1. Assess assets
    a. List all property
    b. Assign fair market value on all property
    c. Categorize all assets as either current, intermediate, or fixed
    d. Determine the total assets by adding values of current, intermediate, and fixed assets
    e. Record data

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 6. Calculate and Record Liabilities

****

Performance Objective: Given materials listed below, calculate and record liabilities of the farm business.

Standard: Instructor must confirm that calculations and recordings measure at market value farm liabilities.

Materials Needed: Calculator, Complete Farm Business Financial Records, Inventories, Microcomputer, Financial Statement, Software Programs.

Enabling Objectives: Know the characteristics of different liabilities.

Performance Guide:

1. Determine liabilities
    a. List all obligations
    b. Categorize all liabilities as either current, intermediate, or fixed
    c. Determine the total liabilities by adding values of the current, intermediate, and fixed liabilities
    d. Record data

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 7. Calculate and Record Expenses

****

Performance Objective: Given materials listed below, calculate and record monthly/yearly farm operating expenses.

Standard: Calculations and recordings must be accurate and include all the operating expenses for the farm enterprise.

Materials Needed: Agriculture Finance Publications, Calculator, Cash Flow Chart, Farm Record Books.

Enabling Objectives: Know how to read and interpret farm records.
Know how to use calculator.

Performance Guide:

1. Identify information
    a. Cancelled checks
    b. receipts paid
    c. unpaid bills
    d. bank statements
    e. tax records
2. Determine farm operating expenses
    a. separate family/household expenses from farm
    b. sort farm expenses into enterprise
3. Record/transmit data to record books or accounting service

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 8. Calculate Net Income

****

Performance Objective: Given materials listed below and access to farm records, calculate and record net income for a year.

Standard: Calculations and recordings must accurately reflect net income for the farm business.

Materials Needed: Agriculture Finance Publications, Calculator, Complete Farm Records, Farm Records Summary.

Enabling Objectives: Know how to read and interpret farm records.
Know how to use a calculator.

Performance Guide:

1. Determine farm receipts and operating expenses for the year
2. Subtract cash expense for the year from cash income for the year
3. Record net cash operating income for the year
4. Record any non-cash expense and income
5. Make adjustments to net cash income
6. Record net income for the year

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 9. Calculate Amount of Life Insurance Needed

****

Performance Objective: Given materials listed below, size and value of your farming enterprise and mortgage, calculate amount of life insurance needed.

Standard: The insurance coverage must provide an amount sufficient to maintain the enterprise for the family in case of death.

Materials Needed: Calculator, Credit Records, Farm Records.

Enabling Objectives: Know about the different kinds of life insurance.

Performance Guide:

1. Define life insurance terms
2. Determine amount of money owed
3. Determine amount needed for the continuance of the enterprise
4. Determine costs
5. Obtain interpretation of insurance coverage
6. Compare available insurance for amount, type, and long term cost and benefits
7. Contract for coverage

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 10. Calculate and Record Depreciation

****

Performance Objective: Given materials listed below, calculate and record depreciation.

Standard: Instructor must confirm that calculations and recordings are accurate and reflect the depreciation method most advantageous to the farm enterprise for the current year.

Materials Needed: Agriculture Depreciation Publications, Calculator, Farmer's IRS Income Tax Guide, IRS Publications, Microcomputer, Depreciation Software Programs.

Enabling Objectives: Know how to operate computer and software.
Know different methods of depreciation.

Performance Objective:

1. Define terms in calculating depreciation
2. Determine depreciation records needed for farm business
3. List available depreciation methods
4. Compare advantages and disadvantages of each method
5. Select most advantageous method
6. Using selected method, calculate and record depreciation
7. Using selected computer software program, calculate and record depreciation

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 11. Calculate and Record Net Worth of Farm Businesses

****

Performance Objective: Given materials listed below, calculate and record net worth of farm business.

Standard: Calculations and recordings must measure net worth gain from productivity on a cost basis and net worth at market value.

Materials Needed: Calculator, Complete Farm Business Financial Records, Inventories.

Enabling Objectives: Know how to use calculator.
Know how to read and interpret farm financial records.

Performance Objective:

1. Assess assets
2. Determine liabilities
3. Determine net worth
4. Record net worth

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 12. Fill Out Income Tax Form: Income or Loss

****

Performance Objective: Given materials listed below and records of farm income and farm expense, complete income tax form Income or Loss Schedule.

Standard: The completed schedule must include all income or loss of the farm enterprise.

Materials Needed: Agriculture Tax Publications, Calculator, Farmer's Tax Guide, IRS Capital Gains Form, IRS Farm Schedule, IRS Investment Credit Form, Record Books.

Enabling Objectives: Know how to read and interpret farm records.

Performance Objective:

1. Record totals of farm income
2. Record totals of farm expense
3. Compute gain or loss
4. Enter in appropriate spaces on farm business income or loss schedule
5. Transfer information to other tax forms

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 13. Fill Out Federal Income Tax Capital Gains or Loss

****

Performance Objective: Given materials listed below, records of capital gains or losses, and short- and long-term capital gains or losses, complete federal income tax capital gains or loss schedule.

Standard: The completed schedule must include all capital gain or loss items of the farm enterprise.

Materials Needed: Agriculture Tax Publications, Calculator, Farmer's Tax Guide, IRS Capital Gains Form, Record Books.

Enabling Objectives: Know how to read and interpret farm records.

Performance Objective:

1. Record sales of all eligible items for capital gains or loss
2. Record purchase of eligible items
3. Record improvements made on eligible items since purchase
4. Record number of months eligible items are held
5. Assess short- or long-term capital gains or losses for eligible items
6. Record informations on proper tax schedule

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 14. Fill out Federal Income Tax Investment Credit Schedule

****

Performance Objective: Given materials listed below and items and records subject to investment credit, complete federal income tax investment credit schedule.

Standard: The completed schedule must include all investment credit items of the farm enterprise.

Materials Needed: Agriculture Tax Publications, Calculator, Farmer's Tax Guide, IRS Capital Gains Form, Record Books.

Enabling Objectives: Know how to read and interpret farm records.

Performance Objective:

1. Record qualified investment and realistic life of items subject to investment credit
2. Compute investment credit appropriate to item(s) on investment credit schedule
3. Complete records of sales of items subject to investment credit
4. Record information in appropriate spaces on income tax investment credit schedule

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 15. Fill Out Federal Income Tax FICA Schedule

****

Performance Objective: Given materials listed below, farm income eligible for FICA, and farm gain or minimum income, complete federal income tax FICA schedule.

Standard: The completed schedule must include all FICA-related items of the farm enterprise.

Materials Needed: Agriculture Tax Publications, Calculator, Farmer's Tax Guide, IRS FICA Schedule, Record Books.

Enabling Objectives: Know how to read and interpret farm records.

Performance Objective:

1. Assess farm income eligible for FICA taxes
2. List farm income eligible for FICA taxes
3. Calculate FICA taxes due
4. Record information in proper spaces on FICA schedule

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 16. Complete Federal Income Tax Form 1040

****

Performance Objective: Given materials listed below, completed federal tax schedules, and federal income tax form 1040, complete federal income tax form 1040.

Standard: The completed form must include all income information of the farm enterprise and the tax due/refund amount must be correct.

Materials Needed: Agriculture Tax Publications, Calculator, Completed Federal Income Tax Forms and Schedules, Farmers' Tax Guide, Record Books.

Enabling Objectives: Know how to read and interpret farm records.

Performance Objective:

1. Obtain completed federal income tax schedules
2. Transfer bottom line figures from:
    a. Farm income or loss schedule
    b. capital gains or loss schedule
    c. investment credit schedule
    d. FICA schedule
3. Enter "other" income in appropriate boxes
4. Calculate total income and deductions
5. Calculate taxable income
6. Compute tax due (or refund)
7. Record information in correct spaces on tax forms
8. Attach W-2 forms to federal income tax form
9. Send completed tax form to appropriate tax office with supportive materials as required

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 17. Hire Workers

****

Performance Objective: Given materials listed below, an assessment of labor needed, competencies required, potential employee(s), training record and record of employment, hire worker(s).

Standard: Workers must be hired according to state/federal regulations and with qualifications that meet the needs of the farm enterprise.

Materials Needed: Agriculture Bulletins, Complete Farm Management Service Publications, Government Regulations Publications (Federal Register), Job Description.

Enabling Objectives: Know how to conduct an interview.
Know how to read and interpret bulletins and publications.

Performance Objective:

1. Check state/federal employment regulations
2. Assess the amount of labor needed
3. Assess degree of competency required
4. Contact prospective employees
5. Interview prospective worker(s)
6. Inform potential employee as to responsibilities and requirements of the job
7. Select desired employees

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 18. Dismiss Workers

****

Performance Objective: Given materials listed below, an assessment of labor needed and record of employee(s) performance, dismiss worker(s).

Standard: Workers must be dismissed according to state/federal employment regulations and to meet the needs of the farm enterprise.

Materials Needed: Agriculture Bulletins, Complete Farm Management Service Publications, Government Regulations Publications (Federal Register).

Enabling Objectives: Know how to read and interpret bulletins and publications.

Performance Objective:

1. Check state/federal regulations on worker dismissal
2. Assess manpower needs
3. Assess employee performance
4. Establish/document any cause for dismissal
5. Dismiss employees

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 19. Develop a Plan for Amount of Labor Needed

****

Performance Objective: Given materials listed below, assess labor needs, and develop plan for amount of labor needed.

Standard: The plan for labor supply must meet the labor needs of the farm enterprise.

Materials Needed: Agriculture Bulletins, Budget Materials, Complete Farm Management Informational Resources, Farm Management Service Publications.

Enabling Objectives: Know how to read and interpret farm bulletins and publications.

Performance Objective:

1. Assess amount of labor required
2. Assess available labor force
3. Study feasibility of additional mechanization to extend labor supply
4. Study feasibility of altering the enterprise to adjust to labor supply
5. Determine peak work loads
6. Determine labor requirements for the enterprise

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 20. Develop and Assign Work Schedules

****

Performance Objective: Given materials listed below, ability of available labor, labor timetable, tax assignment, and supervision plan, develop employee work schedules.

Standard: The work schedule must provide the labor and time allotment for task performance.

Materials Needed: Calender, Work Record Book.

Enabling Objectives: None.

Performance Objective:

1. Assess amount and ability of available labor
2. Assess times and season for work assignment
   - a. Milking
   - b. Crop planting/harvesting
   - c. Holidays, vacations, etc.
   - d. unplanned absences (emergencies etc.)
3. Assess minimum and maximum labor needs
4. Assign responsibility for work tasks

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 21. Comply With Employers Legal Requirements

****

Performance Objective: Given materials listed below, access to employee wage, hour, and tax information, and potential benefits for workers, comply with legal requirements by establishing pay scale and benefits for workers.

Standard: The developed pay scale and benefits must assure competitive compensation in the local job market for retention of qualified employees and be within the ability of the enterprise to pay for it.

Materials Needed: Current Periodicals and Magazines that Provide Help Wanted Position Desired Ads, Farmers' Tax Guide, Farm Management Information Resource, Farm Management Service Publications.

Enabling Objectives: Know how to read and interpret federal guidelines.

Performance Objective:

1. Assess workers' backgrounds and experience
2. Establish wage incentives
3. Calculate and record base pay
4. Calculate fringe benefits
5. Record dollar value of fringe benefits
6. Prepare a payroll schedule for employees

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 22. Train Employees

****

Performance Objective: Given materials listed below, description of a worker's background and experience, and itemized training required, train the worker.

Standard: Upon completion, the worker must be able to perform each task assigned to the minimum competence specified.

Materials Needed: Agriculture Bulletins, Complete Farm Management Information Resource, Current Agriculture Periodicals and Magazines, Farmers' Tax Guide, Farm Informational Resource, Farm Management Service Publications.

Enabling Objectives: Know how to work with people.

Performance Objective:

1. Assess worker's background and experience
2. Select task(s) for which skill(s) is lacking
3. Demonstrate the performance of each task
4. Have worker demonstrate same task(s)
5. Supervise worker's performance
6. Evaluate worker's performance

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 23. Develop Written Work Agreements

****

Performance Objective: Given materials listed below, develop a written work agreement.

Standard: The written work agreement must be acceptable to the employer and employee, and meet federal and state guidelines.

Materials Needed: Work Agreement, Employee Requirements, Employer Requirements, Budget Materials, Complete Farm Management Information Resources, Farm Management Service Publications, Federal and State Employer Bulletins

Enabling Objectives: Know how to read and interpret state and federal publications.

Performance Objective:

1. Determine employer requirements
2. Determine employee requirements
3. Determine federal and state requirements
4. Develop a written work agreement

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 24. Evaluate Work Performance

****

Performance Objective: Given materials listed below, evaluate work performance.

Standard: Evaluation form must be completed, signed by evaluator and employee, and processed and filed according to company's guidelines.

Materials Needed: Employee, Employee's File, Position Description, Employee Evaluation Form.

Enabling Objectives: Know how to fill out an evaluation form.
Know how to recall employee's performance of tasks.
Know how to recall company standards.

Performance Objective:

1. Review employee's file for memos, written warnings, and evidence of continuing education
2. Obtain a company evaluation form
3. Record the tasks that must be performed by the employee on the evaluation form
4. Rate employee's performance of specified tasks according to company's standards:
   a. average
   b. above average
   c. below average
5. Record any comments and recommendations for employee improvement
6. Discuss evaluation with the employee
7. Sign evaluation
8. Request the employee's signature
9. Give the employee a copy of the completed evaluation
10. File a copy of the completed evaluation in the departmental files
11. Submit the completed evaluation to appropriate person/department

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 25. Develop Production Goals

****

Performance Objective: Given materials listed below, dairy animals, their yield ability, and inventory of facilities, labor, and equipment, develop herd production goals.

Standard: The herd production goals must be matched to the available animals, facilities, feed resources, labor, and management of the farm enterprise.

Materials Needed: Budget, Calculator, Dairy Enterprise Publications.

Enabling Objectives: Know how to use a calculator.
Know how to read and interpret farm records.

Performance Objective:

1. Assess prevailing climate of production region
2. Assess amount of feed available
3. Assess available facilities
4. Assess available equipment
5. Assess available labor
6. Assess level of management
7. Assess availability of capital
8. Match farm enterprise goals with available resources

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 26. Comply With Industry Production Standards

****

Performance Objective: Given materials listed below and a dairy animal/product, market dairy animal/product within industry production standards.

Standard: Dairy animal/product must be marketed with industry production standards to produce maximum economic return to the farm enterprise.

Materials Needed: Calculator, Current Market Quotations and Market History, Livestock Costs and Budgets, Marketing Information, AMPI Information.

Enabling Objectives: Know how to read and interpret market information.

Performance Objective:

1. Determine market goals and objectives
2. Calculate production costs
3. Calculate break-even information
4. Assess various marketing alternatives
5. Select marketing method consistent with economic information and goals
6. Produce for market requirements
7. Merchandise dairy animals/products

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 27. Analyze Trends in Dairy Product Demand

****

Performance Objective: Given materials listed below and a dairy animal/product, analyze trends in dairy product demand.

Standard: Trends in Dairy Product Demand should be analyzed to produce maximum economic return to the farm enterprise.

Materials Needed: Calculator, Current Market Quotations and Market History, Livestock Costs and Budgets, Marketing Information.

Enabling Objectives: Know how to read and interpret market information.

Performance Objective:

1. Determine market goals and objectives
2. Calculate production costs
3. Calculate break-even information
4. Assess various marketing alternatives
5. Select marketing method consistent with economic information goals, and trends in demand.
6. Produce for market requirements
7. Merchandise dairy animals/products to meet trends in demand

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 28. Contract for Professional Management Services

****

Performance Objective: Given the materials listed below and a need for the service, contract for a professional management service.

Standard: The professional management service must be economically feasible for the farm enterprise and provide the required services.

Materials Needed: Agricultural Management Publications, Complete Farm Management Information Resource, Farm Management Service Publications

Enabling Objectives: Know how to read and understand agricultural publications.

Performance Objective:

1. Assess service needs
    a. level of personal competence
    b. available equipment/tools
    c. available funding
    d. criticalness of needed services
2. Compare available services
    a. reliability
    b. accessibility
    c. cost
3. Select required management services
4. Negotiate contract

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 29. Develop Plan for Bestowing the Estate

****

Performance Objective: Given the materials listed below, develop a plan for bestowing the estate.

Standard: All resources of the farm enterprise must be included in the plan and must be compatible to family and farm enterprise goals.

Materials Needed: Agricultural Estate Publications, Complete Financial Records.

Enabling Objectives: Know how to prepare a net worth statement.

Performance Objective:

1. Determine assets, liabilities, and net worth
2. Identify heirs and alternate heirs
3. Identify estate goals
4. Obtain legal services
5. Review alternative methods
6. Select alternative most compatible to family and farm enterprise goals.
7. Contract for bestowal
8. File documents

DUTY: P. PREPARING FOR OWNERSHIP

TASK: 30. Calculate and Record Labor and Management Income

****

Performance Objective: Given the materials listed below, calculate and record labor and management income.

Standard: The instructor must agree that calculations and recordings reflect the exact amount of management and labor income generated in the farm enterprise.

Materials Needed: Agricultural Management Publications, Calculator, Farm Business Management Records, Microcomputers, Appropriate Software.

Enabling Objectives: Know the formulas for calculating labor and management income.

Performance Objective:

1. Review definitions of terms used in the calculation of labor and management income.
2. Assign a rate of return on farm investment.
3. Assign a labor income.
4. Assign a management payment.
5. Review records needed to calculate management income.
6. Review records needed to calculate labor income.
7. Calculate management income.
8. Calculate labor income.
9. Record management income.
10. Record labor income.
11. Use a selected computer program to calculate and record labor and management income.

DUTY: Q. STARTING UP HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION PROCESS

TASK: 1. Inspect Equipment Prior to Start-up

****

Performance Objective: Given the materials listed below, inspect equipment prior to start-up.

Standard: The equipment will be inspected to meet USDA, Texas Health Department, FDA, AMPI, and customer standards.

Materials Needed: HTST Previously Cleaned, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Know lock-out procedures.
Know how to determine worn gaskets and valves.

Performance Guide:

1. Inspect outward appearance of HTST unit. Check for presence of product, caustic, soil
2. Inspect fittings and gaskets to determine if gaskets or fittings are bad
3. Inspect valves for proper working condition
4. Inspect pumps for worn impeller, seals, gaskets, bearings or face plates

DUTY: Q. STARTING UP HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION PROCESS

TASK: 2. Adjust Equipment for Start-up

****

Performance Objective: Given the materials listed below, adjust equipment for start-up.

Standard: The equipment will be adjusted to meet USDA, Texas Health Department, FDA, AMPI, and customer standards.

Materials Needed: HTST Previously Cleaned, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Know customer specifications.

Performance Guide:

1. Make hook-ups from CIP to process on HTST unit
2. Make hook-ups on product tank and flow verters
3. Pull sample on product tank to be processed
4. Check sample to be sure customer specifications are being met (SNF, BF, flavor, acid)

DUTY: Q. STARTING UP HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION PROCESS

TASK: 3. Prepare Data Recording Equipment

****

Performance Objective: Given the materials listed below, prepare recording data equipment.

Standard: The equipment will be prepared to meet USDA, Texas Health Department, FDA, AMPI, and customer standards.

Materials Needed: Recording Equipment, Recording Chart #, Rubber Stamp.

Enabling Objectives: Know how to change recording chart.

Performance Guide:

1. Change recording chart at the beginning of each shift (8:00 am, 4:00 pm, 12 am)
2. Properly label chart with operator, date, product, and shift
3. Check recording pens for proper operation and ink

DUTY: Q. STARTING UP HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION PROCESS

TASK: 4. Start-up High-temperature, Short-time Pasteurization Process

****

Performance Objective: Given the materials listed below, start-up high temperature, short-time pasteurization process.

Standard: The process will be meet USDA, Texas Health Department, FDA, AMPI, and customer standards.

Materials Needed: HTST Properly Cleaned, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: None.

Performance Guide:

1. Turn on the power to energize the control panel
2. Start water to the balance tank
3. Start the pumps
4. Place HTST on recycle
5. Start steam to bring temperature up
6. Set the speed and differential pressure
7. Check and record cut-in and cut-out temperatures
8. Check and record indicating temperature

DUTY: R. PROCESSING HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

TASK: 1. Monitor Pasteurization Process

****

Performance Objective: Given the materials listed below, monitor the pasteurization process.

Standard: The pasteurization process will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST properly cleaned, HTST in process, Trained Operator, General Management Practices to Follow.

Enabling Objectives: None.

Performance Guide:

1. Check product coming into balance tank
2. Adjust speed and differential pressure for product being processed
3. Adjust temperature to assure forward flow
4. Monitor steps 1-3 during the entire process

DUTY: R. PROCESSING HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

TASK: 2. Adjust Equipment for High-Temperature, Short-Time Processing

****

Performance Objective: Given the materials listed below, adjust the equipment for high-temperature, short-time processing.

Standard: The pasteurization process will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST properly cleaned, HTST Recycling with Heat-up, Trained Operator, General Management Practices to Follow.

Enabling Objectives: None.

Performance Guide:

1. Run water to balance tank until product flows freely in
2. Start product from tank and make sure product is flowing to balance tank
3. Shut off water to balance tank and place HTST system to drain
4. When product appears at drain, place system in forward flow
5. Adjust HTST to maximum speed for product being processed
6. Adjust differential pressure
7. Observe and set temperature to maintain forward flow

DUTY: R. PROCESSING HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

TASK: 3. Record High-Temperature, Short-Time Processing Data

****

Performance Objective: Given the materials listed below, record high-temperature, short-time processing data.

Standard: The pasteurization process will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST in Progress, Trained Operator, General Management Practices to Follow, Recording Chart, Stamp.

Enabling Objectives: Know how to change chart.
Must be able to write legibly.

Performance Guide:

1. Change temperature chart at the beginning of each 8 hour shift
2. Stamp the chart with the stamp provided
3. Initial chart and designate HTST being used
4. Do cut-in and cut-out of HTST system and record temperature
5. Record indicating temperature and verify accuracy
6. Indicate on temperature chart product being processed

DUTY: R. PROCESSING HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

TASK: 4. Put Product Into Storage Tank

****

Performance Objective: Given the materials listed below, put product into the storage tank.

Standard: The pasteurization process will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST Properly Cleaned, Trained Operator, General Management Practices to Follow, All Data Properly Recorded.

Enabling Objectives: None.

Performance Guide:

1. Make sure storage tank has been cleaned prior to product being started
    a. Recording chart indicates cleaning cycle
    b. Agitator has been cleaned
    c. Valves have been cleaned
2. Assemble storage tank to ready for product
    a. Agitator is in place
    b. Valves are in place
    c. Air lines are connected
    d. Door gasket is in place
    e. Sample cock is in place
3. Turn on cooling to storage tank
4. Start product to tank and inspect for leaks

DUTY: S. PERFORMING PRODUCT-TO-PRODUCT CHANGEOVER

TASK: 1. Prepare Lines and Valves to Bring New Product to Balance Tank

****

Performance Objective: Given the materials listed below, prepare lines and valves to bring new product to balance tank.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST Properly Cleaned, Properly Trained Operator, General Management Practices to Follow, HTST Up to Temperature and in Process.

Enabling Objectives: None.

Performance Guide:

1. Inspect new product tank
    a. Hook-ups in place
    b. Air lines in place
    c. Valves functioning properly
2. Shut water off to balance tank when product appears
3. Place HTST system to drain and observe for product
4. Put system on forward flow when product appears at drain
5. Adjust temperature and differential pressure

DUTY: S. PERFORMING PRODUCT-TO-PRODUCT CHANGEOVER

TASK: 2. Adjust Equipment for Product Changeover

****

Performance Objective: Given the materials listed below, adjust equipment for product changeover.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST Properly Cleaned, Properly Trained Operator, General Management Practices to Follow, Water Going Into Balance Tank, Temperature Chart.

Enabling Objectives: None.

Performance Guide:

1. Record on temperature chart product that is to be processed
2. Make jumper hook-ups if necessary
3. Start product from storage tank and observe flow at the balance tank
4. Adjust temperature and differential pressure if required for new product

DUTY: S. PERFORMING PRODUCT-TO-PRODUCT CHANGEOVER

TASK: 3. Complete Product Changeover Process

****

Performance Objective: Given the materials listed below, complete the product changeover process.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST Properly Cleaned, HTST in Process, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of proper product to product changeover.

Performance Guide:

1. Inspect balance tanks for stoppage of product flow
2. Observe lowering of balance tank level and start water
3. Start next product to be processed to balance tank and turn off water

DUTY: T. PERFORMING PRODUCT CHANGEOVER REQUIRING FLUSH-OUT

TASK: 1. Operate Lines Following Established Sequence

****

Performance Objective: Given the materials listed below, operate lines following established sequence.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST in Forward Flow, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of proper operation of divert valve.

Performance Guide:

1. Put HTST in forward flow
2. Observe sight glass in load-out bay for diluted product
3. Divert flow to reclaim tank when diluted product has been observed
4. Divert flow from reclaim tank to tanker when undiluted
5. Observe product

DUTY: T. PERFORMING PRODUCT CHANGEOVER REQUIRING FLUSH-OUT

TASK: 2. Set Recording Data Equipment for Changeover/Flushout

****

Performance Objective: Given the materials listed below, set recording data equipment for changeover/flushout.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: Recording Charts, Ink Pad, Stamp, HTST in Process, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of FDA recording chart requirements.

Performance Guide:

1. Check indicating temperature against recording temperature
2. Designate on the chart the product that is being processed
3. Change recording chart at the end of 8 hour shift and stamp with stamp provided

DUTY: T. PERFORMING PRODUCT CHANGEOVER REQUIRING FLUSH-OUT

TASK: 3. Perform Flush-out Procedures

****

Performance Objective: Given the materials listed below, perform flush-out procedures.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST in Process, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: None.

Performance Guide:

1. When product flow to balance tank has stopped, turn on water
2. Observe sight glass in load out bay for diluted product
3. When sight glass shows clear water, place HTST on recycle

DUTY: T. PERFORMING PRODUCT CHANGEOVER REQUIRING FLUSH-OUT

TASK: 4. Inspect Equipment for Proper Operation

****

Performance Objective: Given the materials listed below, inspect equipment for proper operation.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST in Process, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of flow and proper operation of HTST system.

Performance Guide:

1. Maintain forward flow on flushout of product
2. Start water to balance tank
3. Observe sight glass for product dilution
4. Divert flow to reclaim tank

DUTY: T. PERFORMING PRODUCT CHANGEOVER REQUIRING FLUSH-OUT

TASK: 5. Complete Product Changeover Process

****

Performance Objective: Given the materials listed below, complete the product changeover process.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST in Process, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of the product changeover process.

Performance Guide:

1. Observe balance tank for stoppage of flow from product silo
2. Start water after product flow to balance tank has stopped
3. Place HTST system on recycle when clear water is observed in the sight glass

DUTY: U. SHUTTING DOWN HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

TASK: 1. Prepare High-temperature Short-time for Shutdown

****

Performance Objective: Given the materials listed below, prepare the HTST for shutdown.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST at the End of the Process, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of the HTST shutdown procedure.

Performance Guide:

1. Place HTST system to drain and flush the system with water until the discharge clears up
2. Kill the power to the pumps
3. Turn off steam
4. Turn off cooling water

DUTY: U. SHUTTING DOWN HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

TASK: 2. Shut Down High-temperature, Short-time System

****

Performance Objective: Given the materials listed below, shut down the high-temperature, short-time system.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST at the End of the Process, Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of the HTST shutdown procedure.

Performance Guide:

1. Observe the balance tank until the product flow has stopped
2. Start the water flow
3. Place HTST system to drain
4. Flush system until water clears up
5. Turn off power to pump
6. Turn off steam
7. Turn off cooling water valve

DUTY: U. SHUTTING DOWN HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

TASK: 3. Inspect Recording Data Equipment

****

Performance Objective: Given the materials listed below, inspect recording data equipment.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: Properly Trained Operator, General Management Practices to Follow.

Enabling Objectives: Knowledge of FDA recording chart regulations.

Performance Guide:

1. Change the recording chart at the beginning of each shift
2. Check recording chart equipment for proper operation

DUTY: V. CLEANING THE HIGH-TEMPERATURE, SHORT-TIME PASTEURIZER

TASK: 1. Inspect and Adjust Equipment and Lines for Cleaning

****

Performance Objective: Given the materials listed below, inspect and adjust equipment and lines for cleaning.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST Flushed Out, Properly Trained Operator, General Management Practices to Follow, Gaskets, Tri-clamps.

Enabling Objectives: Know how to properly label recording chart to meet FDA standards.

Performance Guide:

1. Inspect outside of equipment for soil(product or chemical)
2. Make hook-ups required for cleaning HTST
3. Place HTST system in CIP mode
4. Indicate on recording chart when CIP is started

DUTY: V. CLEANING THE HIGH-TEMPERATURE, SHORT-TIME PASTEURIZER

TASK: 2. Perform Cleaning Procedures

****

Performance Objective: Given the materials listed below, perform cleaning procedures.

Standard: The procedure will meet all USDA, FDA, Texas Health Department, AMPI, and customer standards.

Materials Needed: HTST Shutdown, Properly Trained Operator, General Management Practices to Follow, 50% Caustic, Acid, PH Paper, Protective Chemical Clothing, Caustic Test Kit.

Enabling Objectives:
Know the location of the eye wash station.
Know the data information for each chemical used.
Know general chemical safety.

Performance Guide:

1. Rinse HTST out thoroughly by circulating water
2. If rinse water is not clear, repeat step 1
3. Add approximately 4.5 gallons of 50% caustic and circulate system for 1 1/2 hours at 165 degrees F
4. Rinse HTST out with water until caustic has dissipated
5. Use caustic test kit to determine if caustic has dissipated
6. Add 2-3 gallons of acid and circulate for 1 hour at 145 degrees F
7. Rinse with water until PH is 7 (Use PH paper)

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 1. Comply With Shop and Equipment Safety Rules

****

Performance Objective: Given the materials listed below, comply with shop and equipment safety rules.

Standard: The procedure will meet all OSHA, AMPI, and equipment or tool instruction manual standards.

Materials Needed: Equipment needing Repair, Tools.

Enabling Objectives: Knowledge of all power tools, welders, and other maintenance equipment.

Performance Guide:

1. Lock out or disable broken equipment
2. Select the correct tool or equipment for the repair needed
3. Repair the broken equipment using tools and equipment correctly

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 2. Apply Basic Emergency First-Aid Techniques

****

Performance Objective: Given the materials listed below, apply basic emergency first aid techniques.

Standard: The procedure will meet all American Red Cross and AMPI standards.

Materials Needed: Properly Stocked First-Aid Kit.

Enabling Objectives: Knowledge of first aid procedures.

Performance Guide:

1. Determine the type and extent of the injury
2. Keep injured calm and still
3. Apply first aid for minor injury
4. Apply first aid for major injury
5. Call ambulance, if necessary
6. Fill out accident report

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 3. Complete Accident Report

****

Performance Objective: Given the materials listed below, complete an accident report.

Standard: The procedure will meet all OSHA and AMPI standards.

Materials Needed: Accident Report Form, Pen or Pencil.

Enabling Objectives: Be familiar with the operation zero form.

Performance Guide:

1. Investigate the accident
2. Ask questions - Who? What? When? How? Why?
3. Fill out the operation zero form following all instructions
4. Turn completed form in to office
5. Follow up and correct the hazard if necessary

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 4. Inspect Work Area and Equipment for Safe Working Environment

****

Performance Objective: Given the materials listed below, inspect the work area and equipment for a safe working environment.

Standard: The procedure will meet all OSHA, AMPI, and General Management Practices standards.

Materials Needed: Tool Kit.

Enabling Objectives: None.

Performance Guide:

1. Check the floor area and wash or pick up any debris found
2. Check all electric motors for proper guards and replace if necessary
3. Check steam or hot water valves for leaks and replace any leaky gaskets
4. Check press for leaks and replace gaskets if necessary

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 5. Use Fire Extinguisher

****

Performance Objective: Given the materials listed below, use fire extinguisher.

Standard: The procedure will meet all OSHA and AMPI standards.

Materials Needed: Fire, Fire Extinguisher.

Enabling Objectives: Knowledge of proper use of fire extinguisher.

Performance Guide:

1. Check the fire extinguisher to make sure that it is fully charged
2. Determine the type of fire
3. Use correct type of extinguisher for type of fire
4. If large fire:
    a. Call fire department
    b. Evacuate the building
    c. Shut off utilities
    d. Use proper breathing apparatus

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 6. Correct Safety Hazards

****

Performance Objective: Given the materials listed below, correct safety hazards.

Standard: The procedure will meet all OSHA and AMPI standards.

Materials Needed: Safety Hazard Needing Correcting.

Enabling Objectives: Knowledge of all equipment.

Performance Guide:

1. Identify the safety hazard
2. If minor, correct the hazard
3. If major:
    a. Contact supervisor
    b. Contact maintenance
    c. Shut equipment down for hazard correction

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 7. Demonstrate Cardiopulmonary Resuscitation (CPR) Techniques

****

Performance Objective: Given the materials listed below, demonstrate cardiopulmonary resuscitation (CPR) techniques.

Standard: The procedure will meet all OSHA, American Red Cross, and AMPI standards.

Materials Needed: Person Needing CPR or Dummy.

Enabling Objectives: CPR certification.

Performance Guide:

1. Check subject for consciousness
2. Check breathing
3. Do two air resuscitations
4. Check pulse
5. Send for ambulance
6. Continue CPR with two air resuscitations to 15 chest compressions for four cycles
7. Check for breathing and heart beat
8. If none, continue cycles until help arrives

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 8. Comply With Safety Requirements for Working Around Automated Systems

****

Performance Objective: Given the materials listed below, comply with safety requirements for working around automated systems.

Standard: The procedure will meet all OSHA and AMPI standards.

Materials Needed: Automated Equipment, Padlocks, Chains.

Enabling Objectives: Knowledge of equipment being used.
Knowledge of lock-out procedure.

Performance Guide:

1. Shut machines down
2. Shut off and lock-out all energies
3. Check to be sure lock-out is safe
4. Complete repairs
5. Reconnect all energies
6. Test machines when all is clear

DUTY: W. APPLYING SAFETY PRACTICES

TASK: 9. Participate in Safety Training Program

****

Performance Objective: Given the materials listed below, participate in a safety training program.

Standard: The procedure will meet all OSHA and AMPI standards.

Materials Needed: None.

Enabling Objectives: None.

Performance Guide:

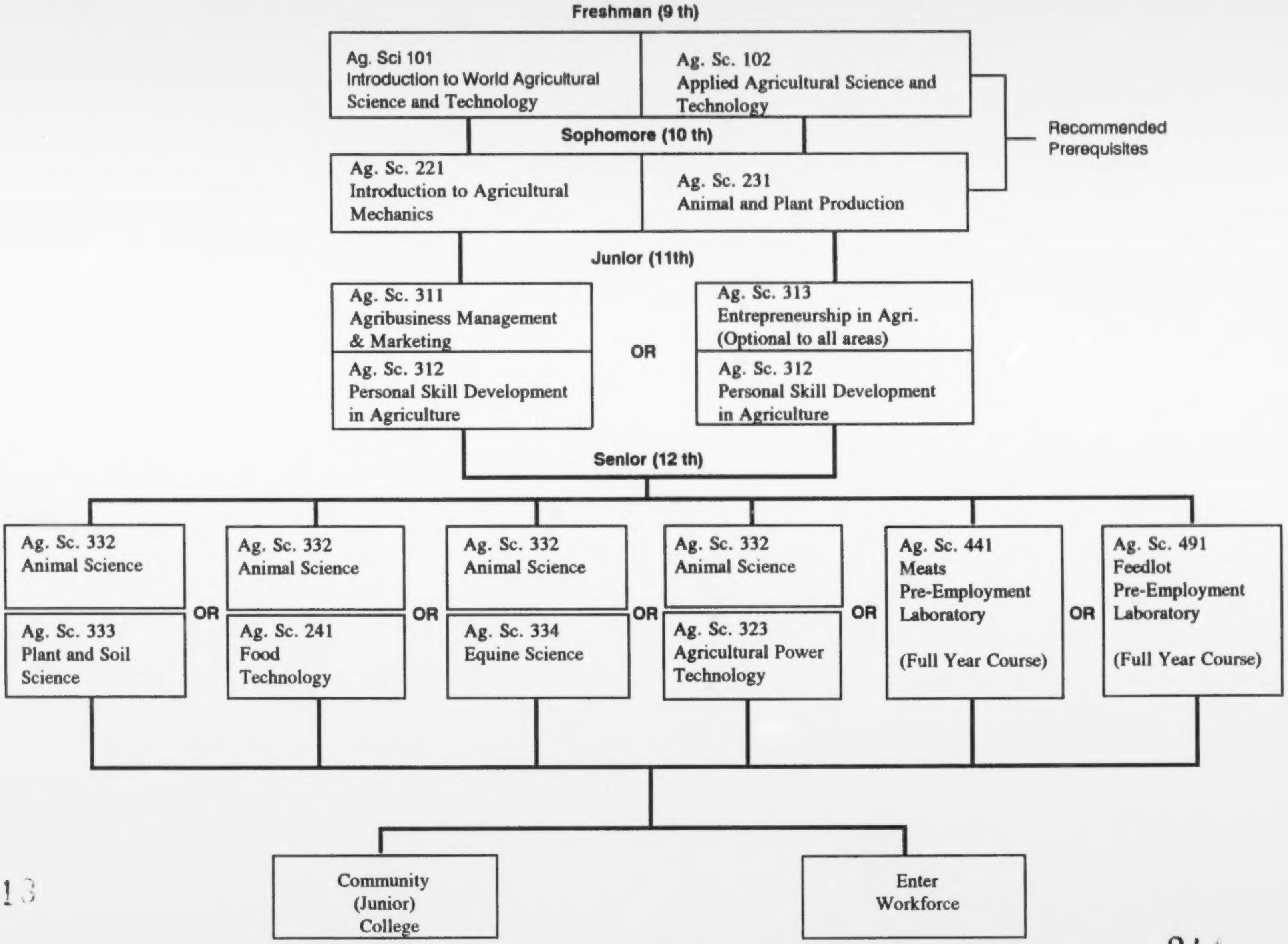
1. Attend monthly loss control program meetings
2. Understand safety concepts:
   a. Lockout
   b. Confined space
   c. MSDS

V. RECOMMENDED SECONDARY AND POSTSECONDARY COURSE OPTIONS FLOWCHART

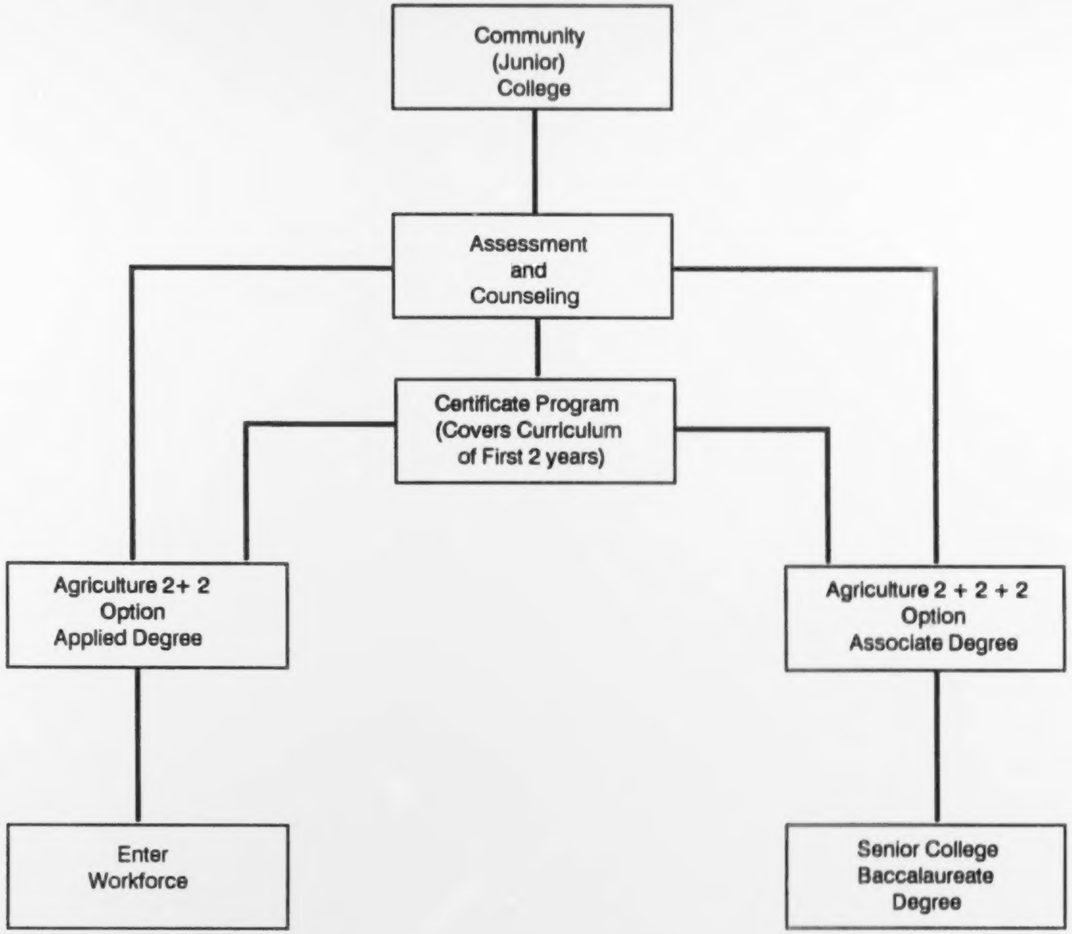
The following flowcharts show the possible courses and routes that a student may take in pursuing a particular 2+2 +2 articulated program.

These charts are examples to be used by other secondary and postsecondary institutions in establishing their own agricultural 2+2 +2 curriculum.

Agriculture 2 + 2 + 2
Animal Science Option


Freshman (9 th)
Ag. Sci 101
Introduction to World Agricultural Science and Technology
Ag. Sc. 102
Applied Agricultural Science and Technology
Recommended Prerequisites
Sophomore (10 th)
Ag. Sc. 221
Introduction to Agricultural Mechanics
Ag. Sc. 231
Animal and Plant Production
Junior (11th)
Ag. Sc. 311
Agribusiness Management & Marketing
Ag. Sc. 312
Personal Skill Development in Agriculture
OR
Ag. Sc. 313
Entrepreneurship in Agri. (Optional to all areas)
Ag. Sc. 312
Personal Skill Development in Agriculture
Senior (12 th)
Ag. Sc. 332
Animal Science
Ag. Sc. 333
Plant and Soil Science
OR
Ag. Sc. 332
Animal Science
Ag. Sc. 241
Food Technology
OR
Ag. Sc. 332
Animal Science
Ag. Sc. 334
Equine Science
OR
Ag. Sc. 332
Animal Science
Ag. Sc. 323
Agricultural Power Technology
OR
Ag. Sc. 441
Meats Pre-Employment Laboratory
(Full Year Course)
OR
Ag. Sc. 491
Feedlot Pre-Employment Laboratory
(Full Year Course)
Community (Junior) College
Enter Workforce

Agriculture 2 + 2 + 2
Animal Science Option
Continued


Community
(Junior)
College
Assessment
and
Counseling
Certificate Program
(Covers Curriculum
of First 2 years)
Agriculture 2+ 2
Option
Applied Degree
Agriculture 2 + 2 + 2
Option
Associate Degree
Enter
Workforce
Senior College
Baccalaureate
Degree

VI. RECOMMENDED STUDENT PREREQUISITES

Secondary:

The following secondary plans include both the academic and agricultural recommendations for a student who is interested in pursuing an articulated 2+2+2 agricultural program.

Included are the recommended courses beginning with the freshman year and continuing through grade 12. Students on the regular, advanced, or honors tract may follow this plan; however, students on the regular tract must take some higher math and science courses than may be recommended otherwise.

These plans are based upon a seven period day and the only difference in the three is in the area of Physical Education since choosing one of these three options may affect the courses you would have time to take otherwise.

Postsecondary:

These postsecondary plans include both the academic and agricultural course recommendations for the associate degree or the applied degree for a student who is interested in continuing the 2+2 +2 agricultural program.

ARTICULATED CURRICULA FOR AGRISCIENCE TECHNOLOGY

Daingerfield High School Animal Technology Option (Dairy)

	HIGH SCHOOL			
SUBJECT	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR
English	English I Regular or Honors *1	English II Regular or Honors *1	English III Regular or Honors *1	English IV Regular or Honors *1
Mathematics	Algebra I	Geometry	Algebra II	Pre-Calculus Honors *1
Science	Biology I	Physical Science	Chemistry I Regular or Honors *1	
Social Studies	United States History Reg. or Honors *1	World Geography	World History	U.S. Govt. & Free Enterprise
Physical Education	Physical Education / Health	Physical Education		
Agriculture Core	Ag. Sc. 101 Ag. Sc. 102			
Agriculture Core		Ag. Sc. 221 Ag. Sc. 231	Ag. Sc. 222 Optional	
Agriculture Specialty			Ag. Sc. 311 Ag. Sc. 312	Ag. Sc. 321 Ag. Sc. 323
Agriculture Specialty				Ag. Sc. 332 Ag. Sc. 333
Elective	F. A. or Rec. Elective *3	F. A. or Rec. Elective *3	Recommended Elective *4	
Elective			Recommended Elective *4	Computer Elective *2

*1. Students enrolled in the honors program would need to take at least 5 of these courses

*2. Computer course can be selected from the following:
- Computer Math
- Business Information Processing

*3. Fine Arts Elective can be selected from the following:
(1 credit required for honors and advanced)

- Theatre Arts
- Introductory Speech
- Music History & Literature
- Band I-IV (Fall counts for P.E. credit, Spring counts as Fine Arts credit)

*4. Recommended Electives can be selected from the following:

- Journalism
- Advanced Journalism

Spanish I Spanish II *1	(Students in honors need to take these courses but regular students may also)

- Personal Business Management
- Typing I
- Record Keeping
- Accounting
- Advanced Accounting
- Introduction to Computer Programming
- Psychology
- Sociology

ARTICULATED CURRICULA FOR AGRISCIENCE TECHNOLOGY

Daingerfield High School Animal Technology Option (Dairy)

	HIGH SCHOOL			
SUBJECT	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR
English	English I Regular or Honors *1	English II Regular or Honors *1	English III Regular or Honors *1	English IV Regular or Honors *1
Mathematics	Algebra I	Geometry	Algebra II	Pre-Calculus Honors *1
Science	Biology I	Physical Science	Chemistry I Regular or Honors *1	
Social Studies	United States History Reg. or Honors *1	World Geography	World History	U.S. Govt. & Free Enterprise
Physical Education	Band I	Band II	Band III	Band IV
Agriculture Core	Ag. Sc. 101 Ag. Sc. 102			
Agriculture Core		Ag. Sc. 221 Ag. Sc. 231	Ag. Sc. 222 Optional	
Agriculture Specialty			Ag. Sc. 311 Ag. Sc. 312	Ag. Sc. 321 Ag. Sc. 323
Agriculture Specialty				Ag. Sc. 332 Ag. Sc. 333
Elective	F. A. or Rec. Elective *3	F. A. or Rec. Elective *3	Recommended Elective *4	
Elective	Health		Recommended Elective *4	Computer Elective *2

*1. Students enrolled in the honors program would need to take at least 5 of these courses

*2. Computer course can be selected from the following:
Computer Math
Business Information Processing

*3. Fine Arts Elective can be selected from the following:
(1 credit required for honors and advanced)

Theatre Arts
Introductory Speech
Music History & Literature
Band I-IV (Fall counts for P.E. credit, Spring counts as Fine Arts credit)

*4. Recommended Electives can be selected from the following:

Journalism
Advanced Journalism

Spanish I (Students in honors need to take these
Spanish II *1 courses but regular students may also)

Personal Business Management
Typing I
Record Keeping
Accounting
Advanced Accounting
Introduction to Computer Programming
Psychology
Sociology

ARTICULATED CURRICULA FOR AGRISCIENCE TECHNOLOGY

Daingerfield High School Animal Technology Option (Dairy)

	HIGH SCHOOL			
SUBJECT	FRESHMAN	SOPHOMORE	JUNIOR	SENIOR
English	English I Regular or Honors *1	English II Regular or Honors *1	English III Regular or Honors *1	English IV Regular or Honors *1
Mathematics	Algebra I	Geometry	Algebra II	Pre-Calculus Honors *1
Science	Biology I	Physical Science	Chemistry I Regular or Honors *1	
Social Studies	United States History Reg. or Honors *1	World Geography	World History	U.S. Govt. & Free Enterprise
Physical Education	Athletics	Athletics	Athletics	Athletics
Agriculture Core	Ag. Sc. 101 Ag. Sc. 102			
Agriculture Core		Ag. Sc. 221 Ag. Sc. 231	Ag. Sc. 222 Optional	
Agriculture Specialty			Ag. Sc. 311 Ag. Sc. 312	Ag. Sc. 321 Ag. Sc. 323
Agriculture Specialty				Ag. Sc. 332 Ag. Sc. 333
Elective	F. A. or Rec. Elective *3	F. A. or Rec. Elective *3	Recommended Elective *4	
Elective	Health		Recommended Elective *4	Computer Elective *2

*1. Students enrolled in the honors program would need to take at least 5 of these courses

*2. Computer course can be selected from the following:
Computer Math
Business Information Processing

*3. Fine Arts Elective can be selected from the following:
(1 credit required for honors and advanced)

Theatre Arts
Introductory Speech
Music History & Literature
Band I-IV (Fall counts for P.E. credit, Spring counts as Fine Arts credit)

*4. Recommended Electives can be selected from the following:

Journalism
Advanced Journalism

Spanish I (Students in honors need to take these
Spanish II *1 courses but regular students may also)

Personal Business Management
Typing I
Record Keeping
Accounting
Advanced Accounting
Introduction to Computer Programming
Psychology
Sociology

ARTICULATED CURRICULA FOR AGRISCIENCE TECHNOLOGY

Northeast Texas Community College Animal Technology Option - Associate of Science (Dairy Option)

	POSTSECONDARY			
SUBJECT	FRESHMAN A	FRESHMAN B	SOPHOMORE A	SOPHOMORE B
English	ENGL 1301 3	ENGL 1302 3	ENGL Lit. Elec. 3	SPCH 1301 3
Mathematics	MATH 1311 3			
Science	BIOL 1401 4	BIOL 1402 4		
Science		CHEM 1406 4	CHEM 1407 4	
Social Studies	HIST 1301 3	HIST 1302 3	GOVT 2301 3	GOVT 2302 3
Physical Education			HPER 1	HPER 1
Agriculture Core	AGRI 2371 3		AGRI 1443 3	AGRI 2363 3
Agriculture Specialty			AGRI 1350 3	Food 2400 4
Agriculture Specialty				
Elective		COMP 1301 3		Hum. Elect. 3
Total Hours	16	17	17	17

Basics

ENGL 1301 - English Composition I
ENGL 1302 - English Composition II
ENGL 2311, 2312, 2314, or 2315 Literature
SPCH 1301 - Fundamentals of Speech
MATH 1311 - College Algebra
MATH 1319 - College Trigonometry
CHEM 1406 - General Chemistry I
CHEM 1407 - General Chemistry II
COMP 1301 - Introduction to Computer Science
BIOL 1401 - General Biology (Botany)
BIOL 1402 - General Biology (Zoology)
HIST 1301 - History of the United States to 1877
HIST 1302 - History of the United States since 1877
GOVT 2301 - American National Government
GOVT 2302 - State and Local Government
HPER - Physical Education Activities
Humanities 1301 - Introduction to Humanities

Agriculture Course Offerings

Agri. 1350 - Computers in Agriculture
Agri. 1443 - Agricultural Economics
Agri. 2363 - Forage and Pasture Crops
Agri. 2371 - Dairy Science
Food 2400 - Introductory Food Science

Additional Courses Recommended If Time Allows:

Food 2313 - Technology of Food Processing

ARTICULATED CURRICULA FOR AGRISCIENCE TECHNOLOGY

Northeast Texas Community College Animal Technology Option - Associate of Applied Science (Dairy Option)

	POSTSECONDARY			
SUBJECT	FRESHMAN A	FRESHMAN B	SOPHOMORE A	SOPHOMORE B
English	ENGL 1301 3	SPCH 1301 3		
Mathematics		MATH 1305 3		BUAD 1301 3
Science	BIOL 1401 4	BIOL 1402 4		
Social Studies	HIST 1301 3			
Agriculture Core		AGRI 1303 3	AGRI 1304 3	
Agriculture Core	Food 2400 4	AGRI 2406 4	AGRI 2363 3	
Agriculture Core			Food 2313 3	AGRI 2483 4
Agriculture Specialty			AGRI 2371 3	AGRI 2308 4
Agriculture Specialty			AGRI 2372 3	AGRI 1443 3
Elective	COMP 13o1 3		AGRI 1350 3	Hum. Elect. 3
Total Hours	17	17	18	17

Basics

ENGL 1301 - English Composition I
SPCH 1301 - Fundamentals of Speech
MATH 1305 - Intermediate Algebra
BUAD 1301 - Introduction to Business
BIOL 1401 - General Biology (Botany)
BIOL 1402 - General Biology (Zoology)
COMP 1301 - Introduction to Computer Science
HIST 1301 - History of the United States to 1877
Humanities 1301 - Introduction to Humanities

Agriculture Course Offerings

1303 - Animal Nutrition and Feeding
1304 - Animal and Poultry Health Management
1350 - Computers in Agriculture
1443 - Agricultural Economics
2308 - Cooperative Education
2363 - Forage and Pasture Crops
2371 - Dairy Science
2372 - Dairy Management
2406 - Principles of Genetics
2483 - Reproductive Physiology
Food 2313 - Technology of Food Processing
Food 2400 - Introductory Food Science

VII. BASIC COURSE OUTLINES

This section includes the basic course outlines for the agriscience courses to be taught at the secondary level and the course outlines for the postsecondary level agriculture courses.

Although this is a 2+2 +2 articulated curriculum, we have included in this section the basic course outlines for the recommended prerequisites also.

SECONDARY COURSE OUTLINES

Agriscience 101- Introduction to World Agricultural Science and Technology

A. Recognize the Importance of Agriculture in the World

1. Understand Supply and Demand of Food and Fiber
2. Identify the Availability of Renewable and Nonrenewable Agricultural Resources
3. Understand the Impact of Agriculture on the World Economy
4. Describe the Interdependency of Agriculture and Other Segments of Society

B. Explain the Historical Significance of Agriculture

1. Identify Key Developments Shaping Modern Agriculture in the World
2. Identify Key Developments Shaping Modern Agriculture in the United States

C. Recognize the Interdependency of Agriculture and World Politics

1. Identify Factors Affecting World Trade
2. Recognize the Impact of Agriculture as a Political Tool

D. Recognize the Interdependency of Agriculture and the Environment

1. Identify Environmental Concerns in Agriculture
2. List Methods of Protecting the Environment
3. Recognize the Impact of the Environment on Agriculture

E. Explain the Food and Fiber System

1. Explain the Food Chain - from Production to Consumption
2. Explain the Fiber Chain - from Production to Usage

F. Identify Research and Development in Agriculture

1. Understand the Impact of Research and Development and Identify Current Developments in Agricultural Science and Technology
2. Apply Research and Development in the Classroom and Laboratory

G. Explore Career and Other Opportunities in Agriculture

1. Conduct a Career Self-Analysis
2. Recognize the Career Decision-Making Process
3. Develop Job Seeking Skills
4. Identify Full-Time Career Opportunities in Agriculture
5. Identify Part-Time Career Opportunities in Agriculture
6. Identify Avocational Opportunities in Agriculture

H. Develop Personal and Social Skills

  1. Develop Professionalism and Ethics
  2. Use Proper Etiquette and Behavior
  3. Explore Personal Relations
  4. Practice Good Grooming and Health Habits

I. Improve Communication Skills

  1. Understand the Importance of Effective Communication: Speaking
  2. Understand the Importance of Effective Communication: Writing
  3. Improve Communication Skills Through Organized Activities
  4. Utilize the Media for Effective Communication

J. Develop Leadership Skills in Agricultural Science and Technology Through the FFA

  1. Develop Life Skills for Effective Leadership
  2. Explore Opportunities for Leadership Development Through the FFA
  3. Use Democratic Principles in Conducting Effective Meetings
  4. Understand the FFA Organization

K. Examine Personal Financial Management

  1. Discuss the Importance and Procedures of Keeping Accurate Records
  2. Describe the Importance and Use of Budgeting
  3. Describe the Importance and Procedures of Personal Finance

L. Analyze Agricultural Experience Programs

  1. Identify Various Types of Supervised Agricultural Experience Programs
  2. Describe the Characteristics of Successful Supervised Agricultural Experience Programs
  3. Select and Plan Individual Supervised Agricultural Experience Programs

Agriscience 102 - Applied Agricultural Science and Technology

A. Identify Soil Formations

1. Recognize the Importance and Formation of Soils
2. Identify Soil Formations

B. Identify the Nature and Properties of Soils

1. Identify Components and Properties of Soils
2. Recognize Soil Classification Systems

C. Explain Basic Plant Science and Technology

1. Describe Plant Structure and Functions of Plant Parts
2. Discuss Plant Growth and Development: Seed Germination
3. Discuss Plant Growth and Development: Production, Storage, and Use of Food in Plants
4. Outline Plant Genetics
5. Outline Plant Reproduction
6. Discuss Plant Breeding
7. Recognize Plants

D. Explain Basic Animal Science and Technology

1. Explain Animal Growth and Development
2. Describe the Anatomy and Physiology of Animals
3. Identify Breeds and Classes of Livestock and Poultry of Economic Importance to the Community
4. Discuss the Importance of Animal Selection
5. Outline Animal Reproduction
6. Outline Animal Genetics
7. Discuss Animal Breeding

E. Determine Basic Food Science Technology

1. Recognize the Importance of Food Science Technology in the World
2. Determine Trends in World Food Production

F. Explore Agricultural Mechanics

1. Identify Major Areas of Agricultural Mechanics
2. Identify Safety and Laboratory Procedures
3. Perform Basic Skills in Agricultural Construction - Tools
4. Identify Lumber and Compute Bill of Materials
5. Identify and Use Fasteners

G. Recognize the Protection of the Environment

  1. Determine the Effect of Agricultural Chemicals on the Environment
  2. Identify the Requirements for the Proper Use of Agricultural Chemicals
  3. Identify Methods of Protecting the Environment

H. Understand Energy and Water Conservation in Agriculture

  1. Determine Alternative Energy Sources for Agricultural Use
  2. Identify Methods of Conserving Electrical Energy and Combustible Fuels
  3. Explain Methods of Conserving Water

I. Explore Career and Other Opportunities in Applied Agricultural Science and Technology

  1. Conduct a Career Self-Analysis
  2. Identify Career Clusters in Agricultural Science and Technology

J. Understand Experience Programs in Agricultural Science and Technology

  1. Identify the Various Types of Supervised Agricultural Experience Programs
  2. Describe the Characteristics of Successful Supervised Agricultural Experience Programs
  3. Select and Plan Individual Supervised Agricultural Experience Programs

K. Plan and Conduct Leadership Activities in Applied Agricultural Science and Technology

  1. Develop Life Skills for Effective Leadership
  2. Practice Leadership Skills for Agricultural Science and Technology

Agriscience 221 - Introduction to Agricultural Mechanics

A. Understand and Apply Safe Work Practices That Apply to Agricultural Mechanics

1. Determine the Importance of Agricultural Mechanics
2. Understand and Apply Safety Practices
3. Understand and Apply Laboratory Management Procedures

B. Explore Career Opportunities in Agricultural Mechanics

1. Perform a Career Self-Analysis
2. Evaluate Careers in Agricultural Mechanics
3. Assess Career-Decision Making Factors
4. Conduct Supervised Agricultural Experience Programs Related to Agricultural Mechanics

C. Plan and Conduct Leadership Activities Related to Agricultural Mechanics

1. Participate in Leadership Organizations
2. Develop Life Skills for Effective Citizenship
3. Participate in FFA Degree and Award Activities

D. Identify, Select, and Use Hand Tools, Power Tools, and Measuring and Marking Devices

1. Identify and Use Hand Tools
2. Identify and Use Power Tools
3. Select and Use Measuring and Marking Devices

E. Identify and Perform Basic Electric Wiring Skills

1. Identify Basic Principles of Electricity and Understand Basic Electrical Terminology
2. Perform Basic Electric Wiring Skills

F. Perform Basic Plumbing Skills

1. Install Pipe and Plumbing Fixtures
2. Maintain Water System

G. Apply Basic Concrete Principles

1. Estimate Materials Needed
2. Construct Forms
3. Place, Reinforce, Finish, and Cure Concrete

H. Practice Basic Carpentry Skills

1. Identify Building Materials
2. Plan Cost Effective Construction
3. Apply Construction Techniques

I. Select and Apply Paints and Preservatives

   1. Select Materials
   2. Apply Brush Painting Techniques
   3. Apply Spray Painting Techniques

J. Identify Fencing Methods

   1. Select Fencing Materials
   2. Plan Fence Construction

K. Perform and Apply Cold Metal Skills

   1. Identify Types of Metals
   2. Cut, File, Shape, and Drill Metal

L. Perform and Apply Hot Metal Skills

   1. Select and Operate Oxy-Fuel Welding and Cutting Equipment
   2. Select and Operate Electric Arc Welding Equipment

Agriscience 231 - Animal and Plant Production

A. Determine the Importance of Soil and Its Influence on Society

   1. Determine the Influence of Soil
   2. Explain the Formation of Soil

B. Identify the Chemical and Physical Properties of Soil

   1. Identify Soil Components
   2. Identify Soil Properties
   3. Recognize Soil Classification Systems
   4. Recognize Methods of Soil Sampling

C. Explain the Conservation of Soil for Future Generations

   1. Identify Kinds of Soil Erosion
   2. Explain the Factors Influencing Soil Erosion
   3. Discuss Soil Erosion Control Measures
   4. Examine the Fundamentals of Soil Use and Land Management

D. Explain the Conservation of Soil Water for Future Generations

   1. Explain the Importance and Loss of Soil Water
   2. Discuss Soil Water Drainage
   3. Identify Water Requirements of Crops
   4. Explain Soil Water Conservation Measures

E. Recognize Methods for Improving Soil Fertility for Agriculture and Home Use

   1. Identify Soil Nutrients
   2. Recognize Uses and Types of Fertilizer
   3. Explain the Importance of Organic Matter
   4. Recognize Soil Deficiencies
   5. Identify Secondary Nutrients, Micronutrients, and Soil pH

F. Determine the Importance of Plants and Their Influence on Society

   1. Determine the Economic Importance of Major Crops
   2. Locate Major Areas of Crop Production in the State, Nation, and World
   3. Identify Major Crops and Their Uses

G. Describe Plant Anatomy and Physiology

   1. Identify Basic Structures and Functions of Plant Parts
   2. Explain Seed Germination in Plants
   3. Describe Photosynthesis, Storage, and Use of Food in Plants

H. Explain Plant Reproduction

1. Explain Sexual Reproduction of Plants
2. Explain Asexual Reproduction of Plants

I. Recognize Plant Nutrient Requirements

1. Recognize Nutrient Requirements of Plants
2. Identify Organic and Inorganic Fertilizers - Types, Sources, and Blends
3. Discuss Methods, Rates, and Timing of Fertilizer Applications and Fertilizer Regulations

J. Select Fundamental Plant Management Techniques

1. Select Mechanical Techniques of Plant Management
2. Select Chemical Techniques of Plant Management

K. Determine the Importance of Animals and Their Influence on Society

1. Examine Classes, Grades, and Numbers of Livestock in the State, Nation, and World
2. Determine Trends in Production and Consumption of Animal Products

L. Evaluate and Select Livestock, Poultry, and Rabbits Based on Performance, Visual Appraisal, and Pedigree

1. Evaluate and Select Beef Cattle
2. Evaluate and Select Dairy Cattle
3. Evaluate and Select Swine
4. Evaluate and Select Horses
5. Evaluate and Select Sheep
6. Evaluate and Select Goats
7. Evaluate and Select Poultry
8. Evaluate and Select Rabbits

M. Evaluate Livestock and Poultry Carcasses and Identify Wholesale and Retail Cuts

1. Evaluate Livestock Carcasses and Identify Wholesale and Retail Cuts
2. Evaluate Poultry Carcasses and Identify Wholesale and Retail Cuts

N. Select Fundamental Animal Management Techniques

1. Select Methods of Safe Handling and Restraining of Domestic Animals
2. Select Methods of Performing Common Surgical and Immunization Skills Used with Domestic Animals
3. Select Methods of Identifying Domestic Animals for Ownership
4. Select Methods of Transporting Domestic Animals

O. Describe the Anatomy and Physiology of Domestic Animals

1. Describe Circulatory Systems of Domestic Animals
2. Describe Respiratory Systems of Domestic Animals
3. Describe Skeletal Systems of Domestic Animals
4. Describe Muscular Systems of Domestic Animals
5. Describe Digestive Systems of Domestic Animals
6. Describe Reproductive Systems of Domestic Animals

P. Recognize Animal Nutrient Requirements

1. Identify Feed Nutrients for Animals
2. Identify Classes of Animal Feeds
3. Identify Feed Additives for Animal Feeds

Q. Manage Records of Soil, Plant, and Animal Related Enterprises

1. Maintain Records of Soil, Plant, and Animal Related Enterprises
2. Analyze Records of Soil, Plant, and Animal Related Enterprises

R. Plan and Conduct Leadership Activities Related to Animal and Plant Production

1. Develop Leadership Skills Related to Animal and Plant Production
2. Participate in Leadership Skills Related to Animal and Plant Production

S. Explore Career Opportunities in Animal and Plant Production

1. Identify Careers in Plant and Soil Science
2. Identify Careers in Animal Science

Agriscience 311- Agribusiness Management and Marketing

A. Examine Agribusiness Management and its Importance

1. Recognize the Importance of Agriculture
2. Describe the Role and Functions of the Manager
3. Investigate the Process of Management Decision Making
4. Discuss the Value of Setting Goals and Objectives

B. Identify Economic Principles Important to Agribusiness Management

1. Discuss Free Enterprise and Economic Systems
2. Examine Consumer Economics: Supply and Demand
3. Examine Producer Economics: Maximizing Profits

C. Illustrate the Use of Budgeting in Decision Making

1. Categorize Income and Cost of Production
2. Examine the Construction and Analysis of Enterprise Budgets
3. Discuss the Use of Whole Farm Budgeting for Planning
4. Investigate the Use of Partial Budgeting to Analyze Proposed Business Changes

D. Analyze Recordkeeping Procedures

1. List the Parts of a Management Information System
2. Compare Accounting Methods
3. Select an Accounting System
4. Prepare Financial Statements: Balance Sheet, Income Statement, and Cash Flow Statement
5. Analyze the Financial Strength of the Business
6. Review Tax Records and Returns
7. Identify Important Production Records
8. Evaluate Production Records

E. Discuss the Acquisition of Capital Resources

1. Compare Methods of Obtaining Capital Resources
2. Identify the Importance and Types of Credit
3. Determine the Institutions that Provide Agricultural Loans
4. Review Loan Application Forms
5. Compare Methods of Computing Interest
6. Compare Types of Loans

F. Explain Business Related Laws

1. Compare Business Types
2. Interpret Common Agricultural Laws
3. Examine Important Government Regulations
4. Review Common Legal Documents

G. Review Methods of Reducing Risk

    1. Identify Risk Management Techniques
    2. Identify Types of Insurance Available
    3. Discuss Sources of Insurance

H. Examine Government Policy Toward Agriculture

    1. Review Past Agricultural Policies
    2. Discuss Recent and Future Government Policies Toward Agriculture

I. Study the Marketing of Agricultural Products

    1. Discuss the Purpose and Importance of Marketing
    2. Discuss the Competitive Environment
    3. Discuss Factors that Influence Market Decisions: Foreign and Domestic
    4. Compare Types of Agricultural Markets
    5. Identify Marketing Alternatives for Production Agriculture
    6. Discuss Forward Contracting: Cash and Futures
    7. Review the Effects of Government Programs and Regulations

J. Examine the Application of Computers to Agribusiness Management

    1. Discuss Appropriate Uses for Computers
    2. Utilize Decision Aid Software
    3. Utilize Computerized Recordkeeping Systems
    4. Identify Guidelines for Selecting a Suitable Computer System

K. Describe the Management of Human Resources

    1. Analyze Employee Benefits
    2. Describe the Employer/Employee Relationship

L. Explore Career Opportunities in Agribusiness Management

Agriscience 312 - Personal Skill Development in Agriculture

A. Discuss Personal Development

1. Develop a Positive Self Concept
2. Develop Social Skills
3. Project a Professional Image

B. Describe an Effective Leader

1. Determine the Traits of a Good Leader
2. Contrast Leadership Styles

C. Develop Leadership Ability

1. Realize Personal Leadership Potential
2. Understand Basic Human Needs
3. Motivating and Influence People
4. Prepare Resumes and Applications

D. Describe Employee Responsibilities

1. Prepare for Job Interviews
2. Describe Employer Expectations
3. Recognize the Importance of Work Related Ethics
4. Get Along with Co-Workers

E. Describe Employer Responsibilities

1. Evaluate Job Applicants
2. Evaluate Employee Performance
3. Develop an Effective Complaint and Appeals Procedure
4. Recognize Employer Responsibilities
5. Recognize the Importance of Business Related Ethics

F. Develop Communications with Groups and Individuals

1. Improve Written Communications
2. Improve Verbal Communications
3. Improve Non-Verbal Communications
4. Participate in Group Discussions
5. Conduct a Successful Meeting
6. Work with Diverse Groups
7. Remove Barriers to Communication
8. Listen Effectively
9. Make Friends

G. Demonstrate Group and Individual Efficiency

1. Develop a Program of Work
2. Organize Groups
3. Establish Personal Goals
4. Manage Time
5. Make Decisions
6. Solve Problems

Agriscience 321 - Agricultural Structures Technology

A. Understand and Apply Safe Work Practices That Apply to Agricultural Structures Technology

1. Determine the Importance of Agricultural Structures Technology
2. Reinforce Basic Technical Skills
3. Identify Safety Practices
4. Identify Laboratory Management Procedures

B. Explore Career Opportunities in Agricultural Structures Technology

1. Perform a Career Self-Analysis
2. Evaluate Careers in Agricultural Structures Technology
3. Assess Career-Decision Making Skills
4. Identify and Conduct Supervised Agricultural Experience Programs Related to Agricultural Structures Technology

C. Plan and Conduct Leadership Activities Related to Agricultural Structures Technology

1. Participate in Leadership Organizations
2. Develop Life Skills for Effective Citizenship
3. Participate in FFA Degree and Award Activities

D. Plan and Construct Agricultural Buildings

1. Select Buildings by Type of Construction and Identify Structural Parts
2. Locate Buildings for Efficiency and Safety
3. Select Equipment for Ventilation, Environmental Control, Waste Handling, and Materials Handling
4. Utilize Computer Assisted Design Techniques in Planning
5. Read Plans or Working Drawings and Plan for Cost Effectiveness
6. Plan Footings, Foundations, and Floors
7. Select and Install Framing, Doors, Windows, Sheeting, Roofing, and Insulation Materials
8. Select and Apply Paints and Preservatives

E. Plan and Construct Agricultural Enclosures

1. Plan Location and Arrangements of Fences and Corrals
2. Select Types and Quality of Fencing Materials
3. Select Electric and Solar Fence Controls and Components
4. Select Types of End and Corner Construction
5. Determine Number and Type of Line Posts
6. Construct Fences and Corrals

F. Install, Service, and Maintain Electrical Systems

1. Reinforce Basic Principles and Terms of Electricity
2. Reinforce Safe Use of Electricity
3. Determine Electrical Needs and Loads
4. Plan Electrical Installations
5. Use the National Electric Code and Local Codes
6. Select Wiring Materials and Supplies
7. Perform Circuit Wiring Operations
8. Make Minor Electrical Repairs and Changes in Electrical Systems

G. Place, Finish, and Cure Concrete Slabs and Structures

1. Plan for Site Preparation and Form Construction
2. Proportion, Reinforce, Place and Finish Concrete
3. Plan Tilt-up Construction
4. Use Masonry Construction

H. Recognize Non-Traditional Structural Building Techniques

1. Evaluate Passive Energy Storage Structures
2. Evaluate Non-Traditional Construction

I. Select and Use Surveying Equipment

1. Level for Grades, Building Layouts, Profiles, and Excavations

J. Plan, Establish, and Maintain Water Management Systems

1. Plan Agricultural Water Systems
2. Install and Maintain Piping Systems
3. Plan, Install, and Maintain Irrigation Systems

Agriscience 323 - Agricultural Power Technology

A. Understand and Apply Safe Work Practices That Apply to Agricultural Power Technology

1. Determine the Importance of Agricultural Power Technology
2. Reinforce Basic Technical Skills
3. Identify Safety Procedures
4. Identify Laboratory Management Procedures

B. Explore Career Opportunities in Agricultural Power Technology

1. Perform a Career Self-Analysis
2. Evaluate Careers in Agricultural Power Technology
3. Assess Career-Decision Making Factors
4. Conduct Supervised Agricultural Experience Programs Related to Agricultural Power Technology

C. Plan and Conduct Leadership Activities Related to Agricultural Power Technology

1. Participate in Leadership Organizations
2. Develop Life Skills for Effective Citizenship
3. Participate in FFA Degree and Award Activities

D. Utilize Tools, Equipment and Facilities

1. Identify and Select Tools an Equipment
2. Maintain and Operate Tools and Equipment
3. Plan, Utilize and Maintain Service Centers

E. Select, Operate, and Maintain Agricultural Machines and Equipment

1. Identify and Select Machines and Equipment
2. Identify and Maintain Component Materials
3. Identify, Select, and Use Fasteners
4. Identify and Service Monitoring, Sensing, and Metering Devices
5. Adjust, Calibrate, Maintain, and Operate Equipment

F. Select, Operate, and Maintain Small Air Cooled Engines

1. Select Small Air Cooled Engines
2. Understand Principles of Two-Stroke and Four-Stroke Cycle Internal Combustion Engines
3. Maintain and Trouble Shoot Small Air Cooled Engines
4. Disassemble and Reassemble Small Air Cooled Engines

G. Select, Operate, and Maintain Tractors

1. Select and Operate Tractors
2. Maintain Air Intake and Exhaust Systems
3. Maintain Lubrication Systems and Select Lubricants
4. Maintain Fuel Systems, Select, Store, and Handle Fuel
5. Maintain DC Electrical Systems
6. Maintain Power Trains
7. Maintain Hydraulic Systems
8. Maintain Steering and Braking Systems
9. Maintain Air Conditioning Systems
10. Select and Maintain Tires, Ballast, and Weight Transfer

H. Select and Maintain Electric Motors

1. Select and Operate Electric Motors
2. Select and Install Controls and Protective Devices
3. Maintain and Trouble Shoot Electric Motors

I. Select and Maintain Hydraulic Motors

1. Select and Operate Hydraulic Motors
2. Maintain Hydraulic Motors and Pumps

Agriscience 332 - Animal Science

A. Identify the Importance of Animal Health, Reproduction, Nutrition and Management to Animal Production

1. Identify the Impact of Health, Reproduction, Nutrition, and Management on Animal Reproduction
2. Compare and Contrast the Impact of Health, Reproduction, Nutrition, and Management on Major Breeds and Classes of Livestock

B. Analyze Animal Anatomy and Physiology Affected by Health, Reproduction, Nutrition and Management

1. Analyze the External Anatomy of Domestic Animals
2. Analyze the Digestive System of Domestic Animals
3. Analyze the Circulatory System of Domestic Animals
4. Analyze the Respiratory System of Domestic Animals
5. Analyze the Nervous System of Domestic Animals
6. Analyze the Reproductive System of Domestic Animals
7. Identify Normal Animal Behavior and Vital Life Signs

C. Explain Animal Genetics and Reproduction

1. Explain the Use of Genetics in the Production and Improvement of Domestic Animals
2. Analyze the Role of Reproductive Physiology in the Production, Growth, and Development of Breeding Animals
3. Explain Various Breeding Systems of Breeding Animals
4. Discuss Methods of Breeding Various Classes of Domestic Animals
5. Explain the Use of Artificial Insemination with Domestic Animals
6. Discuss the Use of Embryo Transfer in Domestic Animals
7. Discuss Pregnancy Diagnosis in Domestic Animals
8. Explain the Care of Domestic Animals During Pregnancy and at Parturition

D. Evaluate and Select Breeding Animals Based on Performance Testing, Production Records, Progeny Testing, and Visual Appraisal

1. Evaluate and Select Beef Cattle
2. Evaluate and Select Dairy Cattle
3. Evaluate and Select Swine
4. Evaluate and Select Sheep and Goats
5. Evaluate and Select Poultry

E. Analyze Breeding Merit of Domestic Animals Based on Carcass Evaluation

1. Evaluate and Grade Beef, Swine, and Sheep Carcasses
2. Relate Carcass Merit to Fabrication of Beef, Pork, and Lamb Wholesale and Retail Cuts
3. Evaluate and Grade Poultry Carcasses

F. Determine Nutritional Requirements of Domestic Animals

1. Analyze the Physiology of Animal Digestion
2. Determine Nutritional Requirements of Ruminant and Non-Ruminant Domestic Animals
3. Identify Sources of Nutrients for Domestic Animals
4. Identify Uses of Vitamins, Minerals, and Other Feed Additives for Domestic Animals
5. Formulate Rations for Various Classes of Domestic Animals
6. Analyze the Quality of Commercially Prepared Feeds
7. Discuss Feeding Practices for Various Classes of Domestic Animals

G. Identify Domestic Animal Diseases, Causes, and Treatments

1. Examine the Role of Bacteria, Funguses, Viruses, Genetics, and Nutrition in Causing Diseases
2. Identify Methods of Controlling and/or Preventing Diseases
3. Identify Common Domestic Animal Diseases and Recognize Methods of Treatment
4. Identify Infestations and Recognize Methods of Controlling Internal and External Parasites in Domestic Animals
5. Identify the Use of Pharmaceuticals for Immunization and Other Means of Preserving or Improving Animal Health
6. Recognize Methods of Maintaining Livestock Efficiency and Safety Using Common Surgical and Injection Procedures

H. Recognize Domestic Animal Management Techniques

1. Analyze Methods of Developing Productive Breeding Animals
2. Design Efficient Livestock Facilities
3. Select Efficient Equipment to Nurture, Handle, and Restrain Domestic Animals Safely
4. Analyze Efficient Methods of Transporting Domestic Animals
5. Explain Domestic Animal Identification, Classification, Certification, and Registration Systems
6. Identify Legal Aspects of Animal Protection and Production
7. Explore Research in Animal Technology

I. Use Record Keeping in Animal Science

1. Maintain Production, Performance, Progeny, and Health Records
2. Analyze Records for Improved Animal Production

J. Explore Career Opportunities in Animal Science

1. Identify Career Opportunities in Animal Production
2. Identify Career Opportunities in Animal Health

K. Plan and Conduct Leadership Activities Related to Animal Science

1. Develop Leadership Skills Related to Animal Science
2. Participate in Leadership Activities Related to Animal Science

Agriscience 333 - Plant and Soil Science

A. Recognize the Importance and Interrelationship of Soil and Plants

1. Recognize the Importance of Soil and Plants
2. Recognize the Interrelationship of Soil and Plants

B. Explain Soil Formation and Its Influence on the World Population

1. Explain Influence of Soil
2. Explain Formation of Soil

C. Identify the Nature and Properties of Soil

1. Identify Soil Components and Properties
2. Recognize Soil Classification

D. Evaluate Soils Using Available Technical Soil Information

1. Read and Interpret Soil Maps
2. Interpret Soil Surveys
3. Recognize Capability Maps and Numbering Systems
4. Recognize the Use of Soil Maps
5. Determine the Engineering Capabilities of Soils

E. Recognize Agencies Assisting in Soil and Water Conservation

1. Identify the Soil Conservation Service
2. Identify the Agricultural Stabilization and Conservation Service
3. Explain Soil and Water Conservation Districts
4. Explain Watershed Districts
5. Identify Other Soil and Water Regulating Agencies

F. Evaluate Soil Testing

1. Collect Soil Samples
2. Perform a Laboratory Analysis of Soil
3. Identify Commercial Soil Testing Procedures
4. Interpret and Use Soil Test Results

G. Describe the Management of Soil Amendments

1. Determine Types of Fertilizers
2. Determine Methods, Rates, and Timing of Fertilizer Application

H. Explain the Conserving of Soils

1. Explain Wind and Water Erosion Conservation
2. Describe Urban and Rural Land Use Programs

I. Practice Land Evaluation

1. Assess Soil Characteristics
2. Apply Land Use Principles
3. Recognize Rural and Urban Land Appraisal Methods

J. Identify and Recognize the Uses of Major Crops

1. Recognize Plant Uses - Food, Fiber, Shelter, Energy
2. Identify the Importance of Major Plants in the Food Chain

K. Explain Plant Physiology

1. Identify Structures and Functions of Plants
2. Describe Photosynthesis
3. Explain Sexual and Asexual Plant Reproduction
4. Discuss Hybridization

L. Select Quality Seed

1. Recognize Quality Seed
2. Select Appropriate Cultivars of Seed

M. Describe Plant and Soil Management Practices

1. Describe Conventional Tillage Practices
2. Describe No-Till Practices
3. Describe Minimum Tillage Practices
4. Explain Safe Application of Plant Chemicals
5. Discuss Pest Control in Crops

N. Examine Trends in Plant Production

1. Consider Alternative Crops
2. Discuss Urbanization of Food Plant Production
3. Discuss Turf and Lawn Care
4. Examine Research in Soil and Plant Science Technology

O. Use Record Keeping Skills in Plant and Soil Science

1. Maintain Soil and Plant Records
2. Analyze Soil and Plant Records

P. Plan and Conduct Leadership Activities Related to Soil and Plant Science

1. Develop Leadership Skills Related to Soil and Plant Science
2. Participate in Leadership Activities Related to Soil and Plant Science

Q. Explore Career Opportunities in Soil and Plant Science

1. Identify Careers in Soil Science
2. Identify Careers in Plant Science

POSTSECONDARY COURSE OUTLINES

AGRICULTURE 2 + 2 + 2
Dairy Products Management Option
Northeast Texas Community College

Agriculture 2 + 2 Option Applied Degree

- AGRI 1303 Animal Nutrition & Feeding
- AGRI 1304 Animal & Poultry Health Management
- *AGRI 1350 Computers in Agriculture
- AGRI 1443 Agricultural Economics
- AGRI 2308 Cooperative Education
- AGRI 2363 Forage & Pasture Crops
- *AGRI 2371 Dairy Science
- AGRI 2372 Dairy Management
- AGRI 2406 Genetics
- AGRI 2483 Reproductive Physiology
- FOOD 2313 Technology of Food Processing
- FOOD 2400 Introductory Food Science

Certificate Program (Covers Curriculum of First Two Years)

- *AGRI 1101 The Agricultural Industry
- AGRI 1313 Agricultural Mechanics
- AGRI 1414 General Agronomy
- AGRI 1484 Introduction to Animal Science
- AGRI 2386 Farm Buildings

Agriculture 2 + 2 + 2 Option Associate Degree

- *AGRI 1350 Computers in Agriculture
- AGRI 1443 Agricultural Economics
- AGRI 2363 Forage & Pasture Crops
- *AGRI 2371 Dairy Science
- FOOD 2400 Introductory Food Science

Students who do not enter the 2+2 program until after graduation from high school must complete the certificate program before they can continue with the postsecondary course work. They do have the option of testing out of any or all of these classes.

Students who do not score 80% or above on an exit level test that covers the secondary materials must also take the classes in which they failed to master the curriculum.

* These course outlines have not yet been de veloped.

Agriculture 1303
Animal Nutrition and Feeding

Course Objectives

Upon completion of this course the student will be able to:

1. Identify an area, a national, and a global perspective of feed production and nutrition.
2. Quantify the nutritive requirements of livestock and poultry.
3. Identify feeds by color, feel, and texture.
4. Demonstrate knowledge of nutritional and mineral supplement programs for livestock and poultry.
5. Quantify and identify feedstuffs into forages, roughages, etc.
6. Quantify utility and use of feedstuffs into ration formulation.
7. Develop least cost ration formulation.
8. Identify nutritional deficiencies in livestock and poultry and develop methodology whereby the deficiencies can be eliminated.
9. Demonstrate the intricate marketing structure associated with feeds and feeding.

Course Outline

I. Nutrition

   A. Feeds vs Foods
   B. Principles of Nutrition
   C. Digestion and Absorption
   D. Nutrients - Metabolism
   E. Nutrition of Diseases - Toxins

II. Feeds

   A. Types and Roles of Feedstuffs
   B. Pasture and Range Forages
   C. Hay
   D. Silage, Haylage - High Moisture Grain
   E. Grains, High Energy Feed
   F. Protein Supplements
   G. By Product Feeds and Crop Residues
   H. Feed Supplements - Additives - Implants
   I. Feed Processing
   J. Feed Analysis - Feed Evaluation
   K. Buying Feeds - Commercial Feeds - Feed Laws

III. Feeding

A. Animal Behavior - Environmental
B. Feeding Standards - Ration Formulation
C. Feeding Beef Cattle
D. Feeding Dairy Cattle
E. Feeding Sheep
F. Feeding Goats
G. Feeding Swine
H. Feeding Poultry
I. Feeding Horses
J. Feeding Rabbits
K. Feeding Mink
L. Feeding Fish

Agriculture 1304
Animal and Poultry Health Management

Course Objectives

Upon completion of this course, the student will be able to:

1. Identify a global as well as an area perspective of animal diseases.
2. Quantify diseases of livestock.
3. Develop plans for livestock buildings and equipment.
4. Describe the role of animal behavior in livestock disease.
5. Provide knowledge of feeding programs for livestock having diseases.
6. Acquire a workman's knowledge of animal health, disease prevention, and parasite control.
7. Understand impact of disease on profit picture of ranch enterprise.
8. Understand causes of USA and foreign trevist of livestock.

Course Outline

I. Diseases of the Blood, Lymphatic, and Cardiovascular Systems.

II. Diseases of the Digestive System.

III. Diseases of the Endocrine System.

IV. Diseases of the Eye and Ear.

V. Generalized Conditions of Animals

VI. Diseases of the Immune System.

VII. Metabolic Disturbances.

VIII. Diseases of the Musculoskeletal System.

IX. Diseases of the Nervous System.

X. Physical Influences.

XI. Diseases of the Reproductive System.

XII. Diseases of the Respiratory System.

XIII. Diseases of the Skin.

XIV. Diseases of the Urinary System.

XV. Behavioral Diseases

Agriculture 1443
Agricultural Economics

Course Objectives

Successful completion of the course will allow the student to be able to:

1. Identify an area, state, national, and global perspective of agricultural economics.
2. Develop knowledge of supply and demand.
3. Describe the role of land use, capital use, and manpower use in today's farm business.
4. Glean knowledge of market inputs into hedging, futures, and supply pictures.
5. Develop knowledge of the structure as it affects agriculture.
6. Imprint borrowing into today's business decisions.
7. Provide knowledge into assets and liabilities of farm enterprises.
8. Discover cost accounting in machinery and labor.
9. Determine optimum type of agriculture enterprises for a given type of agricultural environment.
10. Develop a system approach to farming and ranching.
11. Discover methods, means, and avenues of the availability of agricultural information.

Course Outline

I. Introduction to Agricultural Management

  A. Management

    1. The scope of the manager
    2. Views of management

II. Applying Economic Principles

  A. Marginal Analysis in Short Run Planning

    1. Input-output relationships
    2. Input-input relationships

  B. Cost Concepts in Decision Making

    1. Classifying costs
    2. Short-run and long-run costs
    3. Short-run cost curves
    4. Application of cost principles
    5. Economics of size

C. Ownership Costs: The Dirty Five

1. Depreciation
2. Interest
3. Repairs
4.. Taxes and insurance
5. Breakeven

III. Monitoring the Business

A. Alternative Record Systems and What They Can Provide

1. Levels of recordkeeping system
2. Output and use of record system

B. Business Analysis and Control

1. One record system
2. The inventory and depreciation schedule
3. Financial statement
4. Profit and loss statement
5. Financial ratio analysis
6. Cash flow
7. Performance of activity analysis
8. Measures of performance

C. Diagnosing Farm Business Problems

1. Methods of analysis
2. Earnings problems
3. Problem of size
4. Operational problems
5. Marketing problems

D. A Simplified Management Audit With Limited Information

1. Single income tax return: single proprietorship
2. Adjustment to taxable income
3. Simplified analysis

IV. Forward Planning

A. Budgeting Documented Decision Making

1. Some budget types
2. Budget coefficients
3. Pretesting a decision with patrol budgeting
4. Budgeting a major investment decision

B. Farm Resource Inventory

1. Resource inventory
2. Land
3. Labor
4. Capital
5. Services
6. Management
7. From inventory to planning

C. Using Enterprise Budgeting

1. Sample enterprise budgets
2. More than one budget per enterprise
3. Purpose of budget influences control
4. Comments on enterprise budgets

D. Whole Ranch/Farm Planning

1. Block budgeting
2. Cropping systems
3. Livestock systems
4. Present-normal situation
5. Cash flow feasibility

E. Linear Programming

1. Linear programming defined
2. Budgeting
3. Logic of linear programming

V. Business Organization and Resource Management

A. Types of Farm Business Ownership

1. Sole proprietorship
2. Partnership
3. Corporate

B. Credit Sources and Credit Factors

1. Production credit associations
2. Banks
3. Merchants and dealers
4. Life insurance companies
5. Federal land banks
6. Farmers home administration
7. Individuals
8. Is borrower's credit worthy? Lender's viewpoint
9. What to expect from lender

C. Capital Use and Credit Planning

1. Alternative uses of capital
2. Use by farmers and ranchers
3. Credit
4. Principle of increasing risk
5. Time and interest rate
6. Types of loans
7. The true interest rate
8. A credit rating

D. Land Acquisition and Use Strategies

1. Incentives to control land
2. Land ownership
3. Approach to land evaluation
4. Farmland leasing
5. Lease or purchase

VI. Investment Analysis

A. Investment Analysis and Decision Making

1. Time value of money
2. Cost of capital and selecting a discount rate
3. Developing the cash flow budget

B. Choosing Between Alternative Investment Opportunities

1. Techniques
2. Present worth technique
3. Tax considerations
4. Feasibility of investment
5. Uncertainty and risk

VII. Taxes and Insurance

A. Insurance

1. Priority listing of insurance needs
2. Property insurance
3. Comprehensive liability insurance
4. Liability insurance for employees and workmen's compensation
5. Crop insurance
6. Life insurance
7. Health and accident insurance
8. Policy comparison

B. Income Tax Management

1. Method of reporting
2. When to use tax management strategies
3. Income leveling strategies
4. Special tax situations

Agriculture 2308
Cooperative Education
Dairy

Course Objective

Upon completion of yyhis course the student will be able to:

1. Identify an area, a national and a global perspective of dairy enterprises.
2. Quantify the nutritive requirements of dairy cattle.
3. Identify feeds for dairy cattle by color, feel, and texture.
4. Demonstrate knowledge of nutritional and mineral supplement programs for dairy cattle.
5. Quantify and identify feedstuffs into forages, roughages, etc.
6. Quantify utility and use of feedstuffs into ration formulation.
7. Develop least cost ration formulation.
8. Identify nutritional deficiencies in dairy cattle and develop methodology whereby the deficiencies can be eliminated.
9. Demonstrate the intricate marketing structure associated with dairy and milk products.
10. Understand the use of and be able to repair equipment associated with the dairy industry.
11. Understand the processing of milk and milk products.

Course Outline

Activities such as feeding, milking, breeding, marketing, cleaning, disease prevention, handling equipment, and building facilities for a dairy operation will be conducted. Also setup, operation, and shut-down of processing equipment will be accomplished.

The course outline provides for 50% of the semester working in a production operation and the other 50% working in a processing facility. Each days activities will be maintained in a daily log book describing problems, questions, etc. and the resultant answers of how the student, cooperator and instructor handled the problem.

Agriculture 2363
Forage and Pasture Crops

Course Objectives

Upon completion of this course the student will be able to:

1. Identify an area, a national, and a global perspective of plants and forages.
2. Quantify the nutritive requirements of plants.
3. Identify plants by color, feel, shape, and texture.
4. Demonstrate knowledge of nutritional and mineral programs for plants.
5. Quantify and identify plants into forages, roughages, etc.
6. Quantify utility and use of plants into feed formulation.
7. Develop least cost formulation using plants.
8. Identify nutritional deficiencies in plants and develop methodology whereby the deficiencies can be eliminated.
9. Demonstrate the intricate marketing structure associated with plant agriculture.
10. Identify diseases, pests, etc. and determine methods of eliminating them.

Course Outline

I. Nature of Forage Plants

   A. Grasses
   B. Legumes

II. Historic Perspective

   A. Geology
   B. Plant farming - Geographics

III. Grasses

   A. Introduction
   B. Cool - Season Perennials
   C. Warm - Season Perennials

IV. Perennial Legumes

   A. Those Used in Temperate Areas
   B. Warm - Season Legumes

V. Annual Forages

   A. Uses
   B. Crop Species and Use

- VI. Plant Establishment

    - A. Introduction
    - B. Crop Choice
    - C. Seeds and Their Morphology
    - D. Preparation
    - E. Planting
    - F. Growth
    - G. Renovation

- VII. Physiology of Forage Crop Production - Legumes

    - A. Plant Foods
    - B. Storage
    - C. Management
    - D. Growth
    - E. Dormancy
    - F. Stress

- VIII. Physiology of Forage Crop Growth - Legumes

    - A. Shoot Growth
    - B. Root System
    - C. Growth

- IX. Forage Quality

    - A. Chemistry
    - B. Nitrogen and Nonprotein Nitrogen Compounds
    - C. Carbohydrates
    - D. Analysis
    - E. Quality
    - F. Fertilization

- X. Antiquality Factors

    - A. Cyanogenic Glycosides
    - B. Sapoins
    - C. Bloat
    - D. Sweet Clover
    - E. Tannins
    - F. Flavonoids
    - G. Alkaloids
    - H. Fescue
    - I. Nitrates
    - J. Grass Tetany

- XI. Forage Storage - Dry Systems

    - A. Hay
    - B. Dehydration

XII. Forage Storage - Silage

  - A. Process
  - B. Problems
  - C. Methods of Making
  - D. Additives
  - E. Equipment
  - F. Silos

XIII. Fertilizers

  - A. Use
  - B. Nutrient Requirements

XIV. Pests of Forage Crops

  - A. Economic Losses
  - B. Weeds
  - C. Insects
  - D. Diseases

XV. Seed Production from Legumes and Grasses

  - A. Pollination Mechanisms
  - B. Seed Trade Organizations

XVI. Palatability and Grazing Behavior

  - A. Animal's Use
  - B. Evidence From Experiments and Experience
  - C. Grazing behavior

XVII. Pasture Management

  - A. Economic Importance
  - B. Art of Management
  - C. Stocking Rate
  - D. Grazing Systems
  - E. Stockpiling

Agriculture 2372
Dairy Management

Course Objectives

Upon successful completion of the course the student will be able to:

1. Develop terminology useful for discussing dairy and dairy products.
2. Design dairy buildings appropriate for farm enterprises.
3. Design dairy premises that are environmentally sound.
4. Describe the role of animal behavior in dairy cattle.
5. Provide knowledge of feeding programs for livestock.
6. Understand the role of milk in the market place.
7. Develop strategies for marketing dairy cattle and dairy products.
8. Acquire a dairyman's knowledge of animal health, disease prevention, and parasite control.
9. Develop a knowledge of the role of government subsidies in dairy production.
10. Develop knowledge of the role of forages, silage, and concentrates in dairy production.
11. Obtain basis for steps taken in dairy calf raising.
12. Comprehend breeds and breeding programs appropriate for dairy cattle.

Course Outline

I. The Dairy Industry
   - A. History
   - B. Milk - Foundation of Good Nutrition
   - C. Dairy Industry - U.S.
   - D. Importance of Dairy Industry

II. Breeds of Dairy Cattle
   - A. Characteristics of Dairy breeds
   - B. Milk and Butter Fat Production Records
   - C. Programs of Registry

III. Establishing the Herd: Selecting and Judging
   - A. Purebred Business
   - B. Judging Dairy Cattle

IV. Fitting and Showing Dairy Cattle
   - A. Advantages and Disadvantages of Showing
   - B. Feeding for Show and Sale
   - C. Equipment for Show and Sale
   - D. Trimming and Grooming

V. Breeding Dairy Cattle

A. Genetics
B. Selection
C. Systems of Breeding
D. Physiology of Reproduction
E. Artificial Insemination

VI. Sterility and Delayed Breeding

A. Sterility
B. Poor Management and feeding
C. Physiology and Endocrine Glands
D. Inherited Abnormalities
E. Anatomical Defects
F. Bull Sterility

VII. Pasture and Green Chop

A. Classes of Pasture
B. Factors Affecting Pastures
C. Establishing Pastures
D. Management of Pastures

VIII. Hay

A. Importance
B. Hay Kind and Quality
C. Making Hay
D. Systems of Making Hay
E. Storing, Buying, and Selling Hay
F. Hay Feeding

IX. Silage

A. Ensilage Process
B. Advantages and Disadvantages
C. The Silo
D. Kinds of Silage
E. Harvesting Methods
F. How to Make Good Silage
G. Feeding Value
H. Haylage

X. Concentrates, Supplements, and Additives

A. Grains
B. Nitrogenous Feeds
C. Non-Protein-Nitrogen
D. By-Products
E. Minerals
F. Vitamins
G. Additives

XI. Fundamentals of Dairy Cattle Nutrition

    A. Perspective of Nutrition
    B. Physiology of Digestion
    C. Nutritive Needs of Dairy Cattle

XII. Dairy Feeding Program

    A. Evaluating and Buying feeds
    B. Feeding Standards - Ration Formulation
    C. Feeding Program

XIII. Dairy Cattle Behavior and Environment

    A. Animal Behavior
    B. Social Relations
    C. Animal Environment
    D. Pollution Control

XIV. Dairy Cattle Management

    A. Dairy Management
    B. Records
    C. Manure

XV. Dairy Cattle Health, Disease Prevention and Parasite Control

    A. Program for Health
    B. Diseases of Dairy cattle
    C. Parasites of Dairy Cattle
    D. Disinfectants
    E. Federal and State Regulatory Programs

XVI. Dairy Cattle Buildings and Equipment

    A. Environmental Control
    B. Plans and Specifications
    C. Space Requirements of Buildings and Equipment for Dairy Cattle
    D. Dairy Cattle equipment
    E. Facilities
    F. Fences

XVII. Dry Cows: Replacement Heifers: Dairy Beef

    A. Dry Cows
    B. Replacement Heifers
    C. Dairy Beef

XVIII. Milk Secretion and Handling

A. Chemical Composition of Milk
B. Cow Secretion Mechanism
C. Milk Synthesis
D. Physiological Factors Regulating Milk Secretion

XIX. Marketing Dairy Products

A. Importance
B. Milk Marketing
C. Milk Manufacture
D. Products for Milk

XX. Business Aspects of Dairying

A. Types of Dairy business
B. Managing
C. Records
D. Budgets
E. Insurance

Agriculture 2406
Genetics

Course Objectives

Upon completion of this course the student will be able to:

1. Identify an area, a national, and a global perspective of the role of genetics.
2. Quantify the genetic requirements of livestock, plants, and poultry.
3. Identify genetic influences on reproduction, production, and sex.
4. Demonstrate knowledge of genetic interactions that influence livestock, plants, and poultry.
5. Quantify and identify genetic interactions in plants, livestock, poultry, etc.
6. Quantify utility and use of genetic materials in the environment.
7. Develop gene splicing interaction.
8. Identify genetic deficiencies in livestock, plants, and poultry and develop methodology whereby the deficiencies can be eliminated.
9. Demonstrate the intricate marketing structure associated with plant and animal genetic materials.

Course Outline

I. Introduction

   A. Life Origin
   B. Domestication of Plants and Animals
   C. Present Status and Problem

II. Basic Processes of Inheritance

   A. The Science of Genetics

III. Reproductive Processes

   A. Male
   B. Female
   C. Augmenting Reproductive Rates on Plants and Animals

IV. Qualitative Genetics

   A. Lethals and Abnormalities
   B. Colors
   C. New Types
   D. Disease and Resistance
   E. Chromosomal Abnormalities

V. Variation

    A. Nature
    B. Measuring

VI. Population Genetics

    A. General
    B. Changes in Gene Frequency
    C. Heredity

VII. Inbreeding and Relationship

    A. Inbreeding
    B. Irregular Inbreeding
    C. Effects of Inbreeding
    D. Inbreeding Experiments

VIII. Outbreeding

    A. Outcrossing
    B. Crossing
    C. Grading
    D. Inbred Lines
    E. Hybridization

IX. Principles of Selection

    A. Characteristics
    B. Effectiveness of Selection
    C. Individual
    D. Mass
    E. Pedigree
    F. Family
    G. Progeny
    H. Environmental Relations
    I. Selection Plateaus

X. Performancy and Progeny Testing

    A. Special vs Field
    B. Species

XI. Improvements

    A. Livestock
    B. Plant

Agriculture 2483
Reproductive Physiology

Course Objectives

Upon completion of this course the student will be able to:

1. Identify an area, a national, and a global perspective of livestock reproduction.
2. Quantify the reproductive requirements of livestock, plants, and poultry.
3. Identify livestock by size, weight, and sex.
4. Demonstrate knowledge of courses of reproductive failure in livestock and poultry.
5. Quantify and identify forces which interact in reproductive capacities of animals.
6. Quantify utility and use of methodology available in reproductive performance.
7. Develop knowledge of pregnancy palpation.
8. Identify breeding methods of livestock and poultry.
9. Demonstrate the intricate marketing structure associated with embryo transplant and artificial insemination of livestock.

Course Outline

I. Macroscopic Male Functional Anatomy

   A. Testis
   B. Epididymis
   C. Deferent Duct
   D. Scrotum
   E. Descent of Testis
   F. Castration
   G. Cryptorchid
   H. Spermatic Cord
   I. Vesicular Glands
   J. Colliculus Seminalis
   K. Prostate
   L. Pelvic Urethra
   M. Bulbourethral Glands
   N. Penis
   O. Retractor Penis Muscles
   P. Glans
   Q. Prepuce
   R. Prolapse

II. Microscopic Anatomy and Spermatogenesis

  A. Cell Types
  B. Scrotum
  C. Testis
  D. Efferent Ducticles
  E. Epididymis
  F. Deferent Duct
  G. Vesicular Glands
  H. Prostrate Glans
  I. Pelvic Urethra
  J. Bulbourethral Glands
  K. Penis
  L. Glans
  M. Prepuce
  N. Sheath

III. Hormones and Puberty in the Male

  A. Hormones
  B. Male Hormones
  C. Puberty

IV. Ejeculation and Semen Collection

  A. Ejaculation
  B. Impotentia Coeundi
  C. Semen Collection

V. Breeding Soundness Evaluation

  A. General Observations
  B. Reproductive Organs
  C. Internal Organs
  D. Semen Evaluation
  E. Criteria
  F. Laboratory Scoring System
  G. Field Evaluation
  H. Final Evaluation
  I. Breeding Capacity Tests
  J. When to Evaluate Sires
  K. Summary

VI. Semen Production, Processing and Storage

- A. Sperm Production
- B. Fate of Sperm
- C. Sire Selection
- D. Nonreturn Rate
- E. Processing Bull Semen
- F. General
- G. Processing Ram Semen
- H. Processing Boar Semen
- I. Processing Stallion Semen
- J. Processing Human Semen
- K. Conclusion

VII. Macroscsopic Female Functional Anatomy

- A. Ovaries
- B. Oviduct
- C. Uterus
- D. Cervix
- E. Vagina
- F. Vestibule
- G. Vulva and Clitoris

VIII. Microscopic Female Functional Anatomy

- A. Ovaries
- B. Oviduct
- C. Uterus
- D. Cervix
- E. Vagina
- F. Hymen
- G. Vestibule
- H. Vulva
- I. Clitoris

IX. Hormones and Puberty in the Female

- A. Hormones
- B. Puberty

X. Estrus and Estrus Cycle

- A. Estrus

XI. Ovulation Control

- A. Cow
- B. Ewe
- C. Sow
- D. Mares
- E. Woman
- F. Superovulation

XII. Artificial Insemination

  A. Introduction
  B. Cattle
  C. Sheep
  D. Sow
  E. Mare
  F. Woman

XIII. Fertilization and Embryo Transfer

  A. Gamete Transport
  B. Fertilization
  C. Embryo Transfer

XIV. Gestation and Pregnancy Determination

  A. Gestation
  B. Pregnancy Determination

XV. Parturition and the Postpartum Period

  A. Parturition

XVI. Visual Appraisal for Breeding Efficiency

  A. Fertile Male
  B. Infertile Male
  C. Fertile female
  D. Infertile Female
  E. General

XVII. Reproductive Diseases

  A. General

Food Technology 2313
Technology of Food Processing

Course Objectives

Upon completion of this course the student will be able to:

1. Identify on an area, a national, and global basis, processes that are a part of food processing.
2. Identify by color, smell, and feel food processing conditions.
3. Demonstrate knowledge of processing problems that affect human population.
4. Identify control measures for processing methodology used in foodstuffs.
5. Identify food additives and processes used in food preparation.
6. Identify modes of food preparation.
7. Identify food packaging technology.

Course Outline

I. What is Food?

  A. In Modern Society
  B. Composition
  C. Micro and Macro Ingredients
  D. Nutritive Value
  E. Industrial Food Processing and Health Food

II. Microorganisms in Food

  A. Forms of Life
  B. Microbial Growth and Spoilage
  C. Water Activity
  D. Food Poisoning
  E. Detection of Microorganisms
  F. Food Fermentation
  G. Role of Microorganisms in Human Nutrition

III. Food Industry

  A. Manufacturing and Preservation
  B. Food Processing
  C. Plant Organization
  D. Quality Control
  E. Government Regulations
  F. Material and Energy Balances
  G. Solubility and Concentration

IV. Processing Fruits and Vegetables

  A. Characteristics
  B. Photosynthesis and Respiration
  C. Harvesting and Ripening
  D. Storage
  E. Preparation Processes
  F. Blanching
  G. Products
  H. Jams and Jellies
  I. Sugar
  J. Nutritional Importance

V. Cereal Grains and Oil Seeds

  A. Raw Materials
  B. Cereal Grains
  C. Baking Bread
  D. Pastry
  E. Milling Processes
  F. Malting
  G. Oil Seed Extraction
  H. Margarine and Vegetable Oils
  I. Oil Emulsions
  J. Nutritional Aspects

VI. Milk and Dairy Products

  A. Milk Production
  B. Milk Composition
  C. Milk Processing
  D. Culturing
  E. Cheese
  F. Butter
  G. Ice Cream
  H. Concentrated and Dried Milk
  I. Nutritive Value of Milk

VII. Processing of Meat, Poultry, and Fish

  A. Sources
  B. Composition
  C. Muscle Nomenclature
  D. Fresh Meat
  E. Curing
  F. Processing
  G. Poultry
  H. Fish and Seafood
  I. Nutritive Value

VIII. Alcoholic and Non-Alcoholic Beverages

A. Products
B. Fermentation
C. Processing
D. Wine Products
E. Coffee and Tea
F. Soft Drinks
G. Nutritional

IX. Food Additives and Food Ingredients

A. Food Additives - What are they?
B. Functional Properties
C. Food Ingredients
D. Food Additives
E. Testing Food Additives
F. Chemical Preservatives
G. Food Contaminants
H. Labeling Requirements
I. Effects in Human Nutrition

X. The Process of Food Preservation

A. Causes and Prevention of Food Spoilage
B. Food Dehydration
C. Food Freezing
D. Heat Sterilization and Canning
E. Other Processes
F. Irradiation
G. Significance of Long-Term Preservation

XI. Food Packaging Technology

A. Purpose
B. Properties of Food Packaging Materials
C. Lamination
D. Effects on Food Stability
E. Modified Atmosphere Packaging
F. Role of Packaging in Distribution Chain

Food Technology 2400
Introductory Food Science

Course Objectives

Upon completion of this course the student will be able to:

1. Identify an area, a national, and a global perspective of food production and its nutritive contents.
2. Quantify the nutritive requirements of humans.
3. Identify food by color, feel, and texture.
4. Demonstrate knowledge of nutritional and mineral supplement programs for the human population.
5. Quantify and identify foods into various food packages.
6. Quantify utility and use of foods for human use.
7. Develop typical rations for humans.
8. Identify nutritional deficiencies of humans and develop methodology whereby the deficiencies can be eliminated.
9. Demonstrate the intricate marketing structure associated with foodstuffs.

Course Outline

I. Introduction - Defining Food Science

    A. Preparation for Food Science
    B. Activities of Food Scientists

II. Characteristics of the Food Industry

    A. Sizes
    B. Components
    C. Industries

III. Constituents of Foods: Properties and Significance

    A. Carbohydrates
    B. Proteins
    C. Fats
    D. Additional Food Components

IV. Nutritive Aspects of Food Constituents

    A. Food and Energy
    B. Role of Carbohydrates, Fats, and Protein
    C. Quality of Protein
    D. Bioavailability of Nutrients
    E. Vitamins
    F. Minerals
    G. Fibers
    H. Water
    I. Stability

V. Unit Operations of Food Industry

A. Common Unit Operations
B. Energy Consolidations

VI. Quality Factors and How They Are Measured

A. Appearance Factors
B. Textural Factors
C. Flavor Factors
D. Standards

VII. Deteriorative Factors and Their Control

A. Major Causes of Food Deterioration
B. Principles of Food Preparation
C. Control of Microorganisms
D. Control of Enzymes

VIII. Heat Preservation and Processing

A. Degrees of Preservation
B. Heat Resistance of Microorganisms
C. Heat Transfers
D. Protective Effects
E. Inoculated Pack Studies
F. Different Temperature - Time Combinations
G. Heating Before or After Packaging
H. Government Regulations

IX. Cold Preservation and Processing

A. Distinction Between Freezing and Refrigeration
B. Refrigeration and Cool Storage
C. Freezing and Frozen Storage

X. Food Dehydration and Concentration

A. Food Dehydration
B. Food Concentration
C. Intermediate Moisture Foods

XI. Food Irradiation and Microwave Heating

A. Food Irradiation
B. Microwave Heating

XII. Fermentations

A. Fermentation
B. Single-cell Protein
C. Genetic Engineering

XIII. Milk and Milk Products

- A. Fluid Milk
- B. Ice Cream
- C. Cheese

XIV. Meat, Poultry, Eggs

- A. Meat and Meat Products
- B. Poultry
- C. Eggs

XV. Seafood

- A. Procurement
- B. Marine Fish
- C. Shell Fish
- D. Fish Meal and Protein Concentrates
- E. Mercury and Other Problems

XVI. Fats, Oils, and Their Products

- A. Effect of Composition
- B. Sources
- C. Properties
- D. Production and Processing
- E. Products Made
- F. Quality Control Tests

XVII. Cereal Grains, Legumes, and Oilseeds

- A. Cereal Grain
- B. Principles of Baking
- C. Legumes and Oilseeds

XVIII. Vegetable and Fruits

- A. Properties
- B. Composition
- C. Structural Features
- D. Activities
- E. Harvesting and Processing
- F. Juices

XIX. Beverages

- A. Carbonated Nonalcoholic
- B. Beer
- C. Wine
- D. Coffee
- E. Tea

XX. Confectionery and Chocolate Products

A. Confectionery Types
B. Ingredients
C. Chocolate
D. Manufacturing Practices

XXI. Food Packaging

A. Requirements and Functions of Containers
B. Types of Containers
C. Packaging Materials
D. Package testing
E. Feature Packages

XXII. Water and Waste

A. Properties and Requirements of Processing Waters
B. Properties of Waste Water
C. Waste Water Treatment
D. Water Solids Upgrading and Treatment
E. Lowering Discharge Volumes

XXIII. Food Additives

A. Food additives
B. Microbiological Considerations
C. FDA Act
D. Food Laws
E. Nongovernment Agencies
F. International Food Standards - Codex Alimentarious
G. Costs

XXIV. Improving Nutritional Quality

A. Change in Food
B. Communication
C. Knowledge
D. Labeling Regulations

XXV. World Food Needs

A. The Problem
B. U.N. Food and Agriculture Organization
C. Aid programs

CERTIFICATE PROGRAM COURSE OUTLINES

Agriculture 1313
Agriculture Mechanics

Course Objectives

Upon successful completion of this course the student will be able to:

1. Develop terminology useful for discussing farm machinery.
2. Design machinery appropriate for farm enterprises.
3. Repair machinery that is environmentally sound.
4. Quantify specifications and read blueprints of machinery.
5. Demonstrate knowledge and technique in choosing materials for a particular farm implement.
6. Demonstrate a working knowledge of wiring in farm machinery.
7. Demonstrate and identify tools used in farm machinery.
8. Quantify, develop, and arrange for contract negotiation as well as financing for farm machinery.
9. Develop a sense of safety values associated with farm machinery.

Course Outline

I. Introduction

  A. Modern Farm Tractors
  B. Diesel Engines
  C. Tractor Fuels, Oils, and Greases

II. Preventive Maintenance

  A. The Meaning of Preventive Maintenance
  B. The Steps in General Maintenance
  C. Maintaining the Lubrication System
  D. Maintaining the Air Cleaner and Crankcase Breather
  E. Maintaining the Cooling System
  F. Maintaining the Fuel System
  G. Maintaining the Electrical System
  H. Maintaining the Hydraulic System
  I. Maintaining the Power Transmission System
  J. Maintaining the Chassis

III. Operation, Repair, and Storage

- A. Operating the Tractor
- B. Operating the Tractor in Cold Weather
- C. Operating the Tractor Safely
- D. Repairing the Engine
- E. Trouble-Shooting Guide
- F. Storing Equipment
- G. Preparing for Use after Storage

IV. Small Engines

- A. Maintenance

Agriculture 1414
General Agronomy

Course Objectives

Successful completion of this course will allow the student to be able to:

1. Identify an area, a national and a global perspective of soil use.
2. Quantify soil types, phases, and classifications.
3. Develop plans using utilization of different soil types.
4. Describe the role of climate on soils.
5. Demonstrate knowledge of fertilization of soils.
6. Acquire working knowledge of plants that will grow on certain soils.
7. Develop plans for soil conservation.
8. Understand and acquire knowledge needed for judging soils.
9. Understand and be able to comprehend soil profile maps, topography maps, and water run off maps.
10. Be able to identify soil by feeling texture.
11. Understand methodology of soils for building materials.
12. Demonstrate knowledge of environmental impact of soils on man's economy.
13. Comprehend the impact of soils on a nation's economy.

Course Outline

I. Soil Science and Use

  A. Formation
  B. Physical Characteristics
  C. Chemical Characteristics
  D. Soil Profile
  E. Soil Maps
  F. Land's Demand for Soil

II. Soils, Nutrition, and Plant Growth

  A. Soils and Plan Growth
  B. How Plants Absorb Nutrients
  C. Plant Nutrients
  D. Mineral Deficiency and Toxiology
  E. Fertilizer as a Pollutant

III. Liming

  A. Why Soils Become Acid
  B. Meaning of Soil pH
  C. What Lime Does to Soil
  D. Kinds of Lime
  E. Lime Requirement
  F. Applying Lime
  G. Lime Conversion Factors

IV. Fertilizing

  A. What is Fertilizer
  B. Types of Fertilizer
  C. Secondary Plant Nutrients
  D. Micronutrients
  E. Soil Testing
  F. Fundamentals of Fertilizer Application
  G. Calculation of Fertilizer Cost

V. Using Organic Residues

  A. Using Crop Residues
  B. Using Animal Residues
  C. Using Sewage Residues
  D. Using Septage
  E. Using Compost
  F. Using Wood Wastes
  G. Using Food Processing Wastes
  H. Using Peat

VI. Tillage Practices

  A. Purposes of Tillage
  B. Soil Conditions
  C. Soil Compaction
  D. Conservation Tillage
  E. Summer Fallow
  F. Double Cropping
  G. Control of Tillage Pans
  H. Control of Surface Crusts

VII. Soil and Water Conservation

A. Sources of Soil Lost
B. Cropping Systems to Reduce Soil Lost
C. Minimum Tillage
D. Terracing
E. Contour Tillage
F. Soil Conservation Service
G. Non-point Source Pollutants
H. Conservation Irrigation
I. Desertification

VIII. Drainage

A. Water Tables
B. Soil Surveys
C. Water Movement in Soil
D. Soil Aeration Drainage and Plant Growth
E. Artificial Drainage
F. Drainage System Selection
G. Tile Drainage
H. Tube Drainage
I. Bed Drainage
J. Ditch Drainage
K. Sump Pump Drainage
L. Vertical Drainage

IX. Irrigation

A. Importance of Water
B. When to Irrigate
C. Selection of Irrigation System
D. Irrigation Methods
E. Fertilizer Application through Irrigation
F. Irrigation Tail Water Management

X. Reclaiming Saline and Sodic Soils

A. Classification of Saline and Sodic Soils
B. Effect of Salt on Plant Growth
C. Selecting Plants that are Saline and Salt Tolerant
D. Water Quality and Saline Soils
E. Reclaiming Prevention and Control Saline Soils
F. Saline Seeps

XI. Judging Soils

    A. Why Judge Soils
    B. Conducting Land Judging
    C. Selecting Site
    D. Land Judging Scorecard
    E. Soil and Land Characteristics
    F. Recommended Land Treatments

XII. Pastures, Soil Water, and Fertility Management

    A. Forage Grasses
    B. Forage Legumes
    C. Soil for Seeding
    D. Fertility Management
    E. Grazing Management
    F. Renovating Pastures
    G. Irrigating Pastures

XIII. Rangelands

    A. Range Management
    B. Range Improvement Practices
    C. Range Management Planning

XIV. Field Crops: Soil, Water, and Fertility Management

    A. Crop Production
    B. Agronomic Classification of Plants

XV. Vegetable Gardens: Soil, Water, and Fertility Management

    A. Tillage
    B. Soil Testing
    C. Agronomic Practices

XVI. Turf and Ornamental Plants: Soil, Water, and Fertility Management

    A. Turf Grasses
    B. Ornamental Plants

XVII. Greenhouses and Nurseries: Soil, Water, and Fertility Management

    A. Preparing Soils for Greenhouses
    B. Greenhouse Mechanics

XVIII. Orchards: Soil, Water, and Fertility Management

    A. Preparing Soils for Orchards
    B. Orchard Management

XIX. Forests: Soil, Water, and Fertility Management

  A. Preparing Soils for Forests
  B. Tree Management

XX. Vegetating Disturbed Areas: Soil, Water, and Fertility Management

  A. Sequence to Establishing Vegetation
  B. Vegetating Areas Disturbed by Surface Mining
  C. Vegetating Areas Disturbed by Road Construction and Urbanization

Agriculture 1484
Introduction to Animal Science

Course Objectives

Successful completion of this course will allow the student to be able to:

1. Identify a global as well as an area perspective of animal production.
2. Quantify genetics and animal breeding.
3. Develop plans for livestock buildings and equipment
4. Describe the role of animal behavior in livestock production.
5. Provide knowledge of feeding programs for livestock
6. Develop strategies for marketing livestock
7. Acquire a workman's knowledge of animal health, disease prevention, and parasite control.
8. Understand meat and animal by-products in the market place.
9. Develop a knowledge of business aspect (hedging, borrowing money) in animal production.
10. Obtain an overall perspective of the beef cattle, dairy, sheep and goat, swine, poultry, and horse industries.

Course Outline

I. General

- A. Food and Animals - A Global Perspective
- B. Animal Science - USA
- C. Genetics and Animal Breeding
- D. Feeding Livestock
- E. Livestock Buildings and Equipment
- F. Animal Health, Disease Prevention, and Parasite Control
- G. Animal Behavior
- H. Marketing Livestock
- I. Meat and Animal By-Products
- J. Business Aspects of Agriculture

II. Beef Cattle

- A. Beef Cattle Industry
- B. Types and Breeds of Cattle
- C. Establishing a Beef herd: Selecting and Judging Beef Cattle
- D. Breeding Beef Cattle
- E. Feeding and Managing Beef Cattle
- F. Cow-Calf System
- G. Stocker Cattle
- H. Feed Lot Cattle
- I. Marketing and Slaughtering

III. Dairy Cattle

  A. Dairy Industry
  B. Breeds of Dairy Cattle
  C. Establishing the Dairy Herd: Selecting and Judging
  D. Breeding
  E. Feeding and Managing
  F. Milk Secretion and Handling
  G. Marketing Milk and Dairy Products

IV. Sheep and Goats

  A. Sheep and Goat Industry
  B. Types and Breeds of Sheep
  C. Establishing the Flock: Selecting and Judging
  D. Systems of Sheep production
  E. Breeding Sheep
  F. Feeding and Managing Sheep
  G. Marketing
  H. Wool and Mohair
  I. Goats

V. Swine

  A. Swine Industry
  B. Types and Breeds of Swine
  C. Establishing the Herd: Selecting and Judging
  D. Breeding Swine
  E. Feeding and managing Swine
  F. Marketing and Slaughtering

VI. Poultry

  A. Poultry industry
  B. Poultry Breeds and Breeding: Selecting and Judging
  C. Feeding and Managing
  D. Poultry House and Equipment
  E. Poultry Health, Disease Prevention, and Parasite Control
  F. The Egg
  G. Marketing of Poultry and Eggs

VII. Horses

  A. Horse industry
  B. Classes, Types, Uses, and Breeds of Horses
  C. Selecting and Judging Horses
  D. Breeding Horses
  E. Feeding and Managing Horses

Agriculture 2386
Farm Buildings

Course Objectives

Upon successful completion of this course the student will be able to:

1. Define terms associated with farm building construction.
2. Determine the importance and economics of planning construction of farm buildings and other farm facilities.
3. Determine the feasibility of contracting vs self construction.
4. Identify various materials used in farm building construction.
5. Understand insulation and ventilation requirements for farm buildings.
6. Consider electrical requirements for farm buildings.
7. Consider plumbing requirements for farm buildings.
8. Figure a bill of materials for constructing a farm building
9. Locate and plan farm buildings for convenience and environmental impact.
10. Estimate total costs of constructing a farm structure.

Course Outline

I. Introduction

  A. Modern Farm Buildings
  B. Building Economics
  C. Determining Feasibility

II. Farmstead Arrangement

  A. Planning the Farmstead
  B. Safety Factors Involved
  C. Environmental Considerations
  D. Cost Efficiency Factors

III. Building Construction Planning

  A. Hiring a Contractor
  B. Subcontracting
  C. Legal Documentation

IV. Building Materials

   A. Concrete and Masonry
   B. Wood
   C. Roofing Materials
   D. Electrical Materials
   E. Plumbing Materials
   F. Wall Covering Materials
   G. Paints and Plastics
   H. Fasteners
   I. Environmental Control Materials
   J. Fencing Materials

V. Estimating Costs of Materials

   A. Figuring Concrete and Masonry
   B. Determining Lumber Costs
   C. Estimating Roofing Costs
   D. Determining Electrical Materials Costs
   E. Figuring Plumbing Materials Costs
   F. Site Work Costs
   G. Painting Costs
   H. Ventilation, Heating, and Insulation Costs
   I. Fencing Costs
   J. Miscellaneous Costs

VI. Constructing Foundations and Floors

   A. Terms Used in Building Foundations and Floors
   B. Planning and Reinforcing
   C. Types and Uses

VII. Wall Construction

   A. Terms Associated with Wall Construction
   B. Stud Frame Construction
   C. Pole Frame Construction
   D. Rigid Frame Construction

VIII. Roof Construction

   A. Terms Associated with Roof Construction
   B. Conventional Framing
   C. Using Trusses
   D. Corrugated Roofing
   E. Shingles

IX. Planning Electrical Wiring

   A. Electrical Terms
   B. Determining Needs
   C. Sizing Wires
   D. Electrical Safety Devices

X. Planning the Plumbing System

  A. Plumbing Terms
  B. Determining Water Needs
  C. Planning the Water Storage Facilities
  D. Determining Sewage Disposal Needs

XI. Environmental Concerns

  A. Determining Insulation Requirements
  B. Ventilation, Heating, and Cooling Requirements
  C. Alternate Energy Sources

XII. Fencing Requirements

  A. Planning Fencing Needs
  B. Corral Planning
  C. Fencing for Livestock Control

XIII. Other Farm Building Requirements

  A. Storage Facilities
  B. Shop Facilities
  C. Miscellaneous Farm Buildings (greenhouses, etc.)

VIII. REFERENCE MATERIAL LISTS

The following lists of reference materials are identified by secondary course.

In addition, a general reference list is provided to be used as supplemental references to those listed for the courses.

Instructional Materials Service
Agriscience 101 References

Catalog Number	Title
4906	Teacher's Key - AgSc 101
CG101	Curriculum Guide for AgSc 101
2101	Transparencies for AgSc 101
8350	Supply and Demand of Food and Fiber
8351	Renewable and Nonrenewable Agricultural Resources
8352	The Impact of Agriculture on World Economy
8353	Interdependency of Agriculture and Society
8354	Key Developments Shaping World Agriculture
8355	Key Developments Shaping US Agriculture
8356	Factors Affecting World Trade
8357	The Impact of Agriculture as a Political Tool
8358	Environmental Concerns in Agriculture
8359	Methods of Protecting the Environment
8360	The Effects of the Environment on Agriculture
8361	World Food Chain - From Production to Consumption
8362	World Fiber Chain - From Production to Consumption
8363	Impact of Research and Development in Ag Science and Technology
8364	Research and Development Techniques for Class and Laboratory
8365	Developing Professionalism and Ethics
8366	Using Proper Etiquette and Behavior
8367	Exploring Personal Relations
8368	Practicing Good Grooming and Health Habits
8369	Understanding Importance of Effective Communication - Spoken Word
8370	Understanding Importance of Effective Communication - Written Word
8371	Improving Communication Skills Through Organized Activities
8372	Utilizing the Media for Effective Communication - Public Relations
8373	Importance and Procedures of Keeping Accurate Records
8374	Importance and Use of Budgeting
8375	Importance and Procedures of Personal Finance
8376	Types of Supervised Agricultural Experience
8377	Characteristics of Successful Agricultural Programs
8378	Planning Supervised Agricultural Experience Programs

Instructional Materials Service
Agriscience 102 References

Catalog Number	Title
4907	Teacher's Key - AgSc 102
CG102	Curriculum Guide for AgSc 102
2102	AgSc 102 Transparencies
K102	Teacher's Key to Topic Tests for AgSc 102
T102	Topic Tests for AgSc 102
8380	Importance and Formation of Soils
8381	Soil Formations
8382	Components and Properties of Soil
8383	Soil Classification Systems
8384	Plant Structure and Functions of Plant Parts
8385	Plant Growth and Development: Seed Germination
8386	Plant Growth and Development: Production, Use, Storage of Food
8387	Plant Genetics
8388	Sexual and Asexual Reproduction of Plants
8389	Plant Breeding
8390	Plant Recognition: Classification and ID of Field Crop Plants
8391	Animal Growth and Development
8392	Anatomy and Physiology of Animals
8393	Breeds of Beef Cattle
8394	Breeds of Swine
8395	Breeds of Sheep
8396	Breeds of Dairy Cattle
8397	Classes, Breeds, and Varieties of Poultry
8398	Breeds of Horses
8399	Selecting Beef Cattle
8400	Selecting Swine
8401	Selecting Sheep
8402	Selecting Dairy Cattle
8403	Selecting Poultry
8404	Selecting Horses
8405	Animal Reproduction
8406	Animal Genetics
8407	Methods of Animal Breeding
8408	Importance of Food Science Technology
8409	Trends in Food Production
8410	Identifying Major Areas of Agricultural Mechanics
8411	Identifying Safety and Laboratory Procedures
8412	Performing Basic Skills in Agricultural Construction
8413	Identifying Lumber and Computing Bill of Materials
8414	Identifying and Using Fasteners
8415	Agricultural Chemicals and the Environment
8416	Proper Use of Agricultural Chemicals
8417	Alternative Energy Sources
8418	Energy Conservation
8419	Water Conservation

Instructional Materials Service
Agriscience 221 References

Catalog Number	Title
0116	Agricultural Mechanization Technical Information
2511	Agricultural Mechanization Transparencies
4629	Agricultural Mechanics: Fundamentals and Application
4908	Teacher's Key - AgSc 221
CG221	Curriculum Guide for AgSc 221
K221	Teacher's Key to Topic Tests for AgSc 221
T221	Topic Tests for AgSc 221
8412	Performing Basic Skills in Agricultural Construction - Tools
8413	Identifying Lumber & Computing Bill of Materials
8414	Identifying and Using Fasteners
8600	Agricultural Mechanics: Importance, Safety & Lab Management
8601-A	Identifying & Using Power Tools
8601-B	Measuring & Marking Devices
8602-A	Electrical Principles & Terminology
8602-B	Electrical Wiring
8603	Pipe, Plumbing, & Water Systems
8604-A	Estimating Materials Needed for Concrete
8604-B	Placing, Reinforcing, Finishing, & Curing Concrete
8605-A	Cost Effective Construction - Materials
8605-B	Cost Effective Construction - Plans
8606	Materials and Painting Techniques
8607	Fencing Materials & Construction
8608	Identifying, Cutting, Drilling, Shaping, & Filing Metal
8609-A	Oxyfuel Welding & Cutting
8609-B	Arc Welding - Introduction & Fundamentals
8609-C	Arc Welding - Basic Steps
8609-D	Arc Welding - Joints, Positions, Uses

Instructional Materials Service
Agriscience 222 References

Catalog Number	Title
4630	Home Repair Handbook
4609	Teacher's Key for AgSc 222
CG222	Curriculum Guide for AgSc 222
8412	Performing Basic Skills in Agricultural Construction - Tools
8602-A	Electrical Principles and Terminology
8602-B	Electrical Wiring
8616	Safety in the Home
8617	Selecting and Using Wood and Metal Fasteners
8618	Repairing and Maintaining the Home Plumbing System
8619	Repairing and Maintaining the Home Electrical System
8620-A	Servicing & Maintaining Home Heating & Cooling Systems
8620-B	Computing Insulation Values & Planning Attic Ventilation
8620-C	Home Energy Efficiency and Solar Heating
8620-D	Maintaining Fireplaces, Wood Heaters, and Chimneys
8621-A	Planning for Painting-Preparing Surfaces-Applying Paint
8621-B	Repairing Walls, Ceilings, and Trim
8621-C	Residential Pest Control
8622	Adjusting and Maintaining Doors and Windows
8623	Repairing and Maintaining the Roof
8624	Estimating Home Concrete Needs
8625	Servicing and Maintaining Engines and Vehicles
8626	Reconditioning Edge Tools
8793-B	Maintaining and Trouble Shooting Small Air-Cooled Engines

Instructional Materials Service
Agriscience 231 References

Catalog Number	Title
4910	Teacher's Key - AgSc 231
CG231	Curriculum Guide for AgSc 231
K231	Teacher's Key - AgSc 231
T231	Topic Tests for Ag Sc 231
8380	Importance and Formation of Soils
8381	Soil Formations
8382	Components and Properties of Soil
8383	Soil Classification Systems
8633-A	Soil Sampling Methods
8634-A	Soil Erosion: Kinds, Factors, Control
8634-B	Fundamentals of Soil Use and Land Management
8635-A	Soil Water Importance - Loss/Drainage
8635-B	Water Requirements of Crops
8635-C	Soil Water Conservation Measures
8636-A	Primary Soil Nutrients
8636-B	Fertilizers: Utilization and Types
8636-C	Importance of Organic Matter
8636-D	Recognizing Nutrient Deficiencies
8636-E	Nutrients and pH of Soil
8637-A	Economic Importance and Uses of Major Agricultural Crops
8637-B	Major Agricultural Crop Production Areas
8390	Plant Recognition: Classification and ID of Field Crop Plants
8637-C	Identification of Major Agricultural Crops: Plant Morphology
8637-D	Identification of Major Agricultural Crops: Field Crops
8637-E	Identification of Major Agricultural Crops: Range Plants
8637-F	Identification of Major Agricultural Crops: Selection of Trees
8637-G	Identification of Major Agricultural Crops: Fruits and Vegetables
8637-H	Identification of Major Agricultural Crops: Nursery/Landscape
8384	Plant Structure and Functions of Plant Parts
8385	Plant Growth and Development: Seed Germination
8386	Plant Growth and Development: Production, Use, Storage of Food
8388	Sexual and Asexual Reproduction of Plants
8640-A	Nutrient Requirements of Plants
8640-B	Inorganic and Organic Fertilizers
8640-C	Methods/Rates/Times - Fertilizer Application
8641-A	Mechanical Techniques of Plant Management: Irrigation and Protection Practices for Cropland
8641-B	Mechanical Techniques of Plant Management: Harvest and Post-Harvest Practices for Crops
8641-C	Chemical Techniques of Plant Management
8642-A	Livestock, Dairy, and Poultry Production
8643	Evaluation and Selection of Dairy Goats

Instructional Materials Service
Agriscience 231 References
Continued

Catalog Number	Title
8644-A	Live Animal Evaluation and Grading
8644-B	Poultry Carcass Evaluation
8399	Selecting Beef Cattle
8400	Selecting Swine
8401	Selecting Sheep
8402	Selecting Dairy Cattle
8403	Selecting Poultry
8404	Selecting Horses
8332	Selection of Rabbits
8645-A	Safe Handling and Restraining of Animals
8645-B	Surgical Skills - Castration
8645-C	Surgical Skills - Dehorning
8645-D	Surgical Skills - Docking
8645-E	Performing Common Immunization Skills
8645-F	Methods of Identifying Livestock
8645-G	Livestock Transportation
8646-A	The Circulatory System
8646-B	The Respiratory System
8646-C	The Skeletal System
8646-D	The Muscular System
8646-E	The Digestive System
8405	Animal Reproduction
8646-F	The Exterior, Nervous, Urinary, and Endocrine Systems of Domestic Animals
8647-A	Feed Nutrients
8647-B	Classes of Feed
8647-C	Feed Additives

Instructional Materials Service
Agriscience 311 References

Catalog Number	Title
4773	Farm and Ranch Business Management
CG311	Curriculum Guide for AgSc 311
4914	Teacher's Key for AgSc 311
8706-A	Importance of Agriculture
8706-B	Management Roles & Functions
8706-C	Management Decision-Making
8706-D	Goals and Objectives
8707-A	Economic Systems
8707-B	Supply & Demand
8707-C	Production Economics: Maximizing Profits
8708-A	Income & Cost of Production
8708-B	Enterprise Budgets
8708-C	Total Budgeting
8708-D	Partial Budgeting
8709-A	Management Information Systems
8709-B	Accounting
8709-C	Balance Sheet
8709-D	Income Statement
8709-E	Cash Flow Statement
8709-F	Financial Statement Analysis
8709-G	Income Taxes and Social Security
8709-H	Production Records
8709-I	Depreciation
8710-A	Obtaining Capital Resources
8710-B	Importance & Types of Credit
8710-C	Agricultural Loan Institutions
8710-D	Computing Interest
8710-E	Types of Loans
8711-A	Business Legal Structures
8711-B	Agricultural Laws and Regulations
8711-C	Legal Documents
8712-A	Risk Management
8712-B	Types of Insurance
8713-A	Past Agricultural Policy
8713-B	Recent & Current Agricultural Policies
8714-A	Purpose and Importance of Marketing
8714-B	The Competitive Environment
8714-C	Domestic and International Marketing Factors
8714-D	Types of Agricultural Markets
8714-E	Marketing Alternatives for Production Agriculture
8714-F	Forward Contracting: Cash and Futures
8714-G	Effects of Government Programs
8715-A	Use & Selection of Computers - Agribusiness
8716-A	Employee Benefits
8716-B	Employer/Employee Relationships
8721-A	Management Roles and Functions
8721-B	Management Goals and Decision Making
8721-C	Managing Risk and Uncertainty
8722-A	Economic Systems, Money Price, and Government Policy
8722-B	Economics: Supply and Demand

Instructional Materials Service
Agriscience 312 References

Catalog Number	Title
CG312	Curriculum for AgSc 312
4915	Teacher's Key for AgSc 312
8736-A	Self Concept
8736-B	Social Skills
8736-C	Professional Image
8737-A	Leaders and Leadership
8737-B	Leadership Styles
8738-A	Personal Leadership Potential
8738-B	Basic Human Needs
8738-C	Motivation and Influence
8738-D	Preparing Resumes and Applications
8739-A	Job Interviews
8739-B	Employer Expectations
8739-C	Work Related Ethics
8739-D	Working with Co-Workers
8740-A	Job Applicants
8740-B	Evaluation of Employees
8740-C	Complaints and Appeals
8740-D	Employee Obligations
8740-E	Business Related Ethics
8741-A	The Communication Process
8741-B	Barriers to Communication
8741-C	Written Communication
8741-D	Verbal Communication
8741-E	Non Verbal Communication
8741-F	Listening
8741-G	Working with Diverse Groups
8741-H	Group Discussions
8741-I	Successful Meetings
8741-J	Friends and Friendship
8742-A	Organizing Groups
8742-B	Program of Activities
8742-C	Decision Making
8742-D	Problem Solving
8742-E	Personal Goals
8742-F	Time Management

Instructional Materials Service
Agriscience 321 References

Catalog Number	Course
CG321	Curriculum Guide for AgSc 321
4917	Teacher's Key for AgSc 321
8108	Agricultural Mechanics Safety Tests
8410	Identifying Major Areas of Agricultural Mechanics
8411	Identifying Safety and Laboratory Procedures
8412	Performing Basic Skills in Agricultural Construction - Tools
8413	Identifying Lumber and Computing Bill of Materials
8600	Agricultural Mechanics: Importance, Safety & Lab Management
8601-A	Identification and Safe Use of Power Tools
8601-B	Measuring & Marking Devices
8602-A	Electrical Principles, Terminology and Safety
8602-B	Electrical Wiring
8603	Installing & Maintaining Pipe, Plumbing Fixtures, & Water Systems
8604-A	Estimating the Materials Needed for Concrete
8604-B	Constructing Forms, Placing, Reinforcing, Finishing & Curing Concrete
8605-A	Planning Cost Effective Construction - Selecting Materials
8605-B	Planning Cost Effective Construction - Preparing Plans
8606	Selecting Materials and Applying Painting Techniques
8607	Selecting Materials & Planning Construction of Fences
8617	Selecting and Using Wood and Metal Fasteners
8618	Repairing and Maintaining the Home Plumbing System
8619	Repairing and Maintaining the Home Electrical System
8620-B	Computing Insulation Values & Planning Attic Ventilation
8621-B	Repairing Walls, Ceilings, and Trim
8622	Adjusting and Maintaining Doors and Windows
8623	Repairing and Maintaining the Roof
8763	Planning Buildings and Selecting Equipment
8764	Utilizing Computers and Computer Assisted Design
8765	Planning Footings, Foundations and Floors
8766	Selecting Electric and Solar Fends Controls and Components
8767	Planning for Site Preparation
8768	Using Tilt-Up Construction
8769	Using Masonry Construction

Instructional Materials Service
Agriscience 321 References
Continued

Catalog Number	Course
8770	Evaluating Passive Energy Storage and Non-Traditional Construction
8771	Selecting and Using Tripod Levels
8772	Measuring Land
8773	Planning, Installing, and Maintaining Irrigation Systems
8774	Complete Set Ag Sc 321 (35 topics, 600 pages)

Instructional Materials Service
Agriscience 323 References

Catalog Number	Title
CG323	Curriculum Guide for AgSc 323
4919	Teacher's Key for AgSc 323
8790	Understanding and Applying Safe Work Practices
8791-A	Identifying, Selecting, Maintaining, and Operating Tools and Equipment
8791-B	Planning & Maintaining Agricultural Power Service Centers
8792-A	Identifying and Selecting Machines and Equipment
8792-B	Identifying and Maintaining Component Materials
8792-C	Identifying, Selecting, and Using Fasteners
8792-D	Identifying and Servicing Monitoring, Sensing, and Metering Devices
8792-E	Adjusting, Calibrating, Maintaining and Operating Equipment
8793-A	Understanding Principles of 2-Cycle and 4-Cycle Internal Combustion Engines
8793-B	Maintaining & Trouble Shooting Small Air-Cooled Engines
8793-C	Disassembling and Reassembling Small Air-Cooled Engines
8794-A	Selecting and Operating Tractors
8794-B	Maintaining Air Intake and Exhaust Systems
8794-C	Selecting Lubricants and Maintaining Lubrication Systems
8794-D	Fuel System Maintenance; Fuel Selection, Storage & Handling
8794-E	Maintaining DC Electrical Systems
8794-F	Maintaining Power Trains
8794-G	Maintaining Hydraulic Systems
8794-H	Maintaining Steering and Braking Systems
8794-I	Maintaining the Air Conditioning System
8795	Selecting, Maintaining, and Operating Electric Motors
8796	Selection, Operating, & Maintaining Hydraulic Motors & Pumps

Instructional Materials Service
Agriscience 332 References

Catalog Number	Title
CG332	Curriculum for AgSc 332
4921	Teacher's Key for AgSc 332
K332	Teacher's Key - AgSc 332 Topic Tests
T332	Topic Tests for AgSc 332
8816	The Importance of Livestock Management
8817-B	Anatomy and Physiology of Other Animal Body Systems - the Nervous, Urinary, and Endocrine Systems
8817-C	Animal Behavior
8818-A	Artificial Insemination
8818-B	Embryo Transfer
8818-C	Pregnancy Diagnosis (Palpation)
8818-D	Care of Livestock at Parturition
8820-A	Evaluating and Grading Carcasses and Wholesale Cuts
8821-B	Formulating Rations for Domestic Animals
8821-C	Quality of Commercially Prepared Feeds
8821-D	Feeding Practices of Beef, Swine, and Sheep
8822-A	Role of Bacteria, Fungi, Viruses, and Nutrition in Causing Animal Diseases
8822-B	Causes, Symptoms, Prevention and Treatment of Various Animal Diseases
8822-C	External and Internal Parasites of Poultry
8822-D	External and Internal Parasites of Livestock
8822-E	Use of Pharmaceuticals in Vaccination and Immunization
8823-A	Planning Livestock Facilities
8823-B	Animal Welfare and Animal Rights
8823-C	Research in Animal and Food Science Technology
8332	Selection of Rabbits
8391	Animal Growth and Development
8399	Selecting Beef Cattle
8400	Selecting Swine
8401	Selecting Sheep
8402	Selecting Dairy Cattle
8403	Selecting Poultry
8405	Animal Reproduction
8406	Animal Genetics
8407	Methods of Animal Breeding
8643	Evaluation and Selection of Goats
8644-A	Live Animal Evaluation and Grading
8644-B	Poultry Carcass Evaluation
8645-A	Safe Handling and Restraining of Animals
8645-B	Surgical Skills - Castration
8645-C	Surgical Skills - Dehorning
8645-D	Surgical Skills - Docking
8645-E	Performing Common Immunization Skills
8645-F	Methods of Identifying Livestock
8645-G	Livestock Transportation
8646-A	The Circulatory System
8646-B	The Respiratory System

Instructional Materials Service
Agriscience 332 References
Continued

Catalog Number	Title
8646-C	The Skeletal System
8646-D	The Muscular System
8646-E	The Digestive System
8647-A	Feed Nutrients
8647-B	Classes of Feed
8647-C	Feed Additives
8832-A	History of Livestock Domestication
8832-B	Importance of Livestock Domestication
8832-C	Livestock Breeds of Economic Importance
8833-A	External Anatomies of Domesticated Animals
8833-B	Skeletal Systems of Domesticated Animals
8833-C	Digestive Systems of Domesticated Animals
8833-D	Circulatory Systems of Domesticated Animals
8833-F	Respiratory Systems of Domesticated Animals
8833-G	Nervous Systems of Domesticated Animals
8833-H	Endocrine Systems of Domesticated Animals
8833-I	Epithelial, Connective, and Muscle Tissues of Domestic Animals
8834-A	Early Mendelian Theories of Genetics
8834-B	DNA, RNA, and Protein Synthesis
8834-C	Animal Cell Division

Instructional Materials Service
Agriscience 333 References

Catalog Number	Title
CG333	Curriculum for AgSc 333
4922	Teacher's Key for AgSc 333
8848-A	Soil and Plants: Importance and Interrelationship
8380	Importance and Formation of Soils
8381	Soil Formations
8511	Elements of Weather
8382	Components and Properties of Soil
8383	Soil Classification Systems
8850-A	Land Use Classification
8850-B	Land Judging
8851-A	Reading, Interpreting, and Using Soil Maps
8851-B	Soil Surveys
8851-C	Capability Maps and Numbering Systems
8851-D	Soil Engineering Properties and Their Effect on Land Use
8852-A	Soil Conservation Service and Soil and Water Conservation Districts
8852-B	Agricultural Stabilization and Conservation Service
8852-C	Watershed Districts and Other Soil and Water Regulating Agencies
8633-A	Soil Sampling Methods
8853-A	Commercial Soil Testing Procedures
8853-B	Soil Test Analysis: Interpretation and Use
8636-B	Fertilizers: Utilization and Types
8640-B	Inorganic and Organic Fertilizers
8640-C	Methods/Rates/Times - Fertilizer Application
8634-A	Soil Erosion: Kinds, Factors, Control
8855-A	Urban and Rural Land Use Programs
8856-A	Land Evaluation: Assessing Soil Characteristics
8856-B	Land Evaluation: Applying Land Use Principles
8856-C	Land Evaluation: Rural and Urban Land Appraisal Methods
8637-A	Economic Importance and Uses of Major Agricultural Crops
8857-A	Importance of Plants in the Food Chain
8384	Plant Structure and Functions of Plant Parts
8858-A	Photosynthesis
8388	Sexual and Asexual Reproduction of Plants
8858-B	Plant Hybridization and Preservation of Pure Lines
8859-A	Selection of Seed Cultivars and Planting Practices
8512	Saving Our Heirlooms - Seeds
8860-A	Tillage Practices: Conventional, Minimum and No-Till
8860-B	Safe Application of Chemicals on Plants
8860-C	Pest Control in Crops
8861-A	Alternative Crops for Agricultural Land (Texas)
8510	Aloe Vera: The Wonder Plant
8513	Edible Flowers
8861-B	Urbanization of Food Plant Production
8861-C	Turfgrass Care for Lawns
8861-D	Research in Plant and Soil Sciences
8514	Conducting Research

Dairy Science References

Instructional Materials Service
Texas A&M University
F.E. Box 2588
College Station, Texas 77843
(409) 845 - 6601

Catalog Number	Title
8402	Selecting Dairy Cattle
8396	Breeds of Dairy Cattle
8642-A	Livestock, Dairy, and Poultry Production
8664-A	Preparing Milk for Processing
8664-B	Processing Milk and Dairy Products
8665-A	Processing Cultured Milk Products
8665-C	Processing Frozen Deserts from Milk
8665-D	Preparing Butter and Concentrated/Dried Milk Products
0037	Milk Processing Plant Employee
0039	Dairy Farm Worker
0227	Science of Providing Milk for Mankind
0407	Linear Classification of Dairy Cattle - Manual
0408	Questions and Answers on Federal Milk Marketing Orders
0409	Judging and Scoring Milk and Cheese
0410	Sediment Standards for Milk and Milk Products
4002	Dairy Cattle Evaluation Handbook
4006	Feeding Dairy Cattle
4022	Artificial Insemination of Livestock
4028	The Cows Udder and How It Functions
4035	Dairy Foods Evaluation Handbook
5017	1980 Dairy Products Judging - Milker Parts (Slides)
5019	Breeds of Dairy Cattle (Slides)
5076	1979 State Dairy Judging - Jersey (Slides)
5077	1979 State Dairy Judging - Holstein (Slides)
5101	1982 Judging Dairy Cattle - Jersey (Slides)
5102	1982 Judging Dairy Cattle - Holstein (Slides)
5115	1984 Dairy Cattle Judging (Slides)
5119	1985 Linear Classification of Dairy Cattle (Slides)
9168	Apple - ID - The Dairy Cow (Computer Program)
9203	Apple II+E/C - Dairy Production and Related Review (Computer Program)
9555	Fitting Dairy Cattle (VHS Video)
9556	Showing Dairy Cattle (VHS Video)
9552	Judging Dairy Cows (VHS Video)
9553	Judging Dairy Heifers (VHS Video)
9554	Introduction to Dairy Judging and Oral Reasons (VHS Video)
9557	Dairy Judging, TAMU (VHS Video)
9586	Practice Dairy Judging I (VHS Video)
9587	Practice Dairy Judging II (VHS Video)

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Curriculum Publications Clearinghouse
Western Illinois University
Harrabin Hall 46
Macomb, Illinois 61455

V-124 V-Tech Catalog - Dairy Worker

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Hobar Publications
1234 Tiller Lane
St. Paul, Minnesota 55112
(612) 633 - 3170

Computer Programs

AP2 - AG110 II+,IIe,IIc	Dairy Production and Related Review
AP2 - AG110 - 3.5 IIGS	
IBM - AG110 IBM PC MS-DOS	
IBM - AG110 - 3.5 IBM PC	
TRS - AG110 TRS 80 III,4	
MAC - AG110	
IBM - AG114 IBM or Compatible	Dairy Ration Balancing
TRS - AG114 TRS 80 I,III,4 48K	
AP2 - AG118 II+,IIe,IIc	Milk and Milk Quality and Related Review
AP2 - AG118 - 3.5 IIGS	
IBM - AG118 IBM PC MS-DOS	
IBM - AG118 - 3.5 IBM PC	
TRS - AG118 TRS 80 III,4	
MAC - AG118	
AP2 - AG100 II+,IIe,IIc,IIGS	Milk Let Down

Videos

15400678	Dairy Production and Management: Animal Acquisition/Reproduction
15400681	Dairy Production and Management: Herd Health/Husbandry
15400679	Dairy Production and Management: Lactation
15400680	Dairy Production and Management: Nutrition
15400682	Dairy Production and Management: Waste Management/Buildings and Equipment
15400859	Dairy Production and Management: Full Set of Above

Hobar Publications
1234 Tiller Lane
St. Paul, Minnesota 55112
(612) 633 - 3170

Texts and Other References

19527-1	Dairy Cattle Production
709818-9	Principles of Dairy Science
1678-7	Dairy Farm Management
F-517	Milking Cows and Controlling Mastitis

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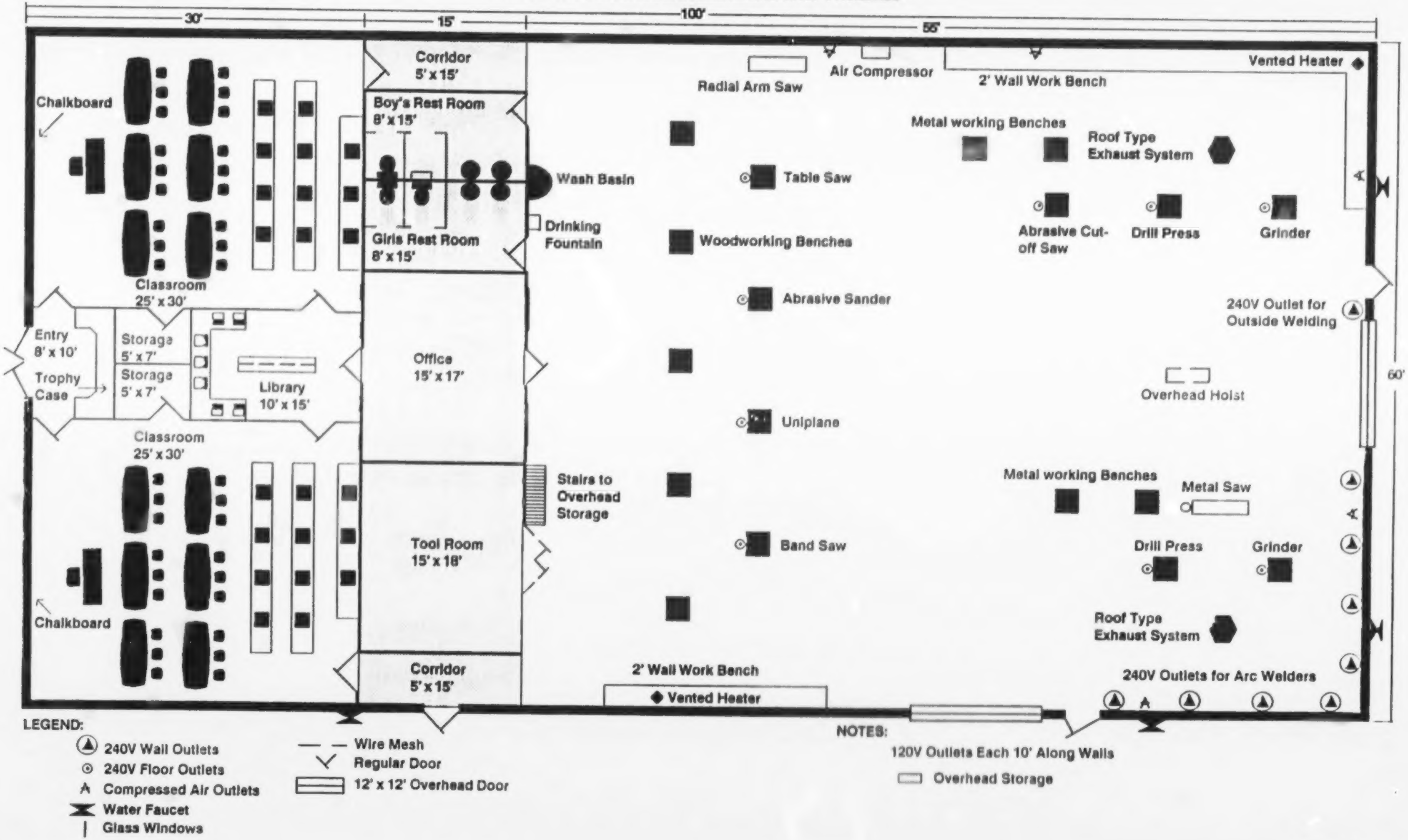
Teaching Aids Inc.
P.O. Box 1798
Costa Mesa, California 92628-7098

VT-107	Semen Collection and Processing (VHS Video)
VT-110	Artificial Insemination in Cattle
VT-109	Calving Problems and Procedures

IX. LINE DRAWING OF RECOMMENDED SECONDARY FACILITY

The following is a line drawing of the recommended classroom and shop facilities for the 2+2+2 program in dairy products management.

AGRISCIENCE CLASSROOM BUILDING AND SHOP FACILITIES



30'
15'
100'
55'
60'
Corridor 5' x 15'
Boy's Rest Room 8' x 15'
Girls Rest Room 8' x 15'
Wash Basin
Drinking Fountain
Chalkboard
Classroom 25' x 30'
Entry 8' x 10'
Trophy Case
Storage 5' x 7'
Storage 5' x 7'
Library 10' x 15'
Office 15' x 17'
Classroom 25' x 30'
Tool Room 15' x 18'
Stairs to Overhead Storage
Chalkboard
Corridor 5' x 15'
Radial Arm Saw
Air Compressor
2' Wall Work Bench
Vented Heater
Metal working Benches
Roof Type Exhaust System
Table Saw
Abrasive Cut-off Saw
Drill Press
Grinder
Woodworking Benches
Abrasive Sander
240V Outlet for Outside Welding
Overhead Hoist
Uniplane
Metal working Benches
Metal Saw
Band Saw
Drill Press
Grinder
Roof Type Exhaust System
2' Wall Work Bench
Vented Heater
240V Outlets for Arc Welders
LEGEND:
240V Wall Outlets
240V Floor Outlets
Compressed Air Outlets
Water Faucet
Glass Windows
Wire Mesh
Regular Door
12' x 12' Overhead Door
NOTES:
120V Outlets Each 10' Along Walls
Overhead Storage

X. LIST OF RECOMMENDED TOOLS AND EQUIPMENT

The following is a list of recommended tools and equipment to be used at the secondary level in the teaching of the skills necessary for a student to succeed in the agricultural 2+2+2 program.

The estimated prices used to determine costs were obtained from tool and equipment supply catalogs and local hardware and lumber companies.

Tools and Equipment

The following hand tool and equipment list specifies the recommended quantities of each tool needed to teach a class of twenty students, and this is the number that a school should purchase when initiating a 2+2+2 Agricultural Technologies Program for Dairy Products Management.

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Blacksmith anvil, steel face, 150 lbs.	2	$472.55	$945.10
Mowing machine anvil, guard & sickle	1	$109.95	$109.95
Scratch awl, 4"	8	$3.95	$31.60
Hand axe, single bit	2	$12.94	$25.88
Pry bar, 17", rolling head	1	$7.95	$7.95
Wrecking bar, gooseneck, 3/4" X 30"	2	$4.75	$9.50
Wrecking bar, gooseneck, 5/8" X 24"	2	$3.95	$7.90
Booster cable battery tool, h/duty	1	$20.99	$20.99
Sliding-T bevel, w/adjusting screw, 8" to 10" blade	5	$4.49	$22.45
Auger bit, 1/4" to 1" by 16ths (sets)	2	$93.20	$186.40
Countersink, power, straight shank	4	$5.99	$23.96
Countersink bit, rosehead, 3/4" x 5"	4	$9.15	$36.60
Electrician's bit, 1/2" bit	1	$14.69	$14.69
Expansion bit, 7/8" to 3"	2	$18.95	$37.90
Extension bit, 18"	1	$8.99	$8.99
Router bit, round shank, 1/4" to 3/4" (14 pieces/set)	1	$102.99	$102.99
Screwdriver bit, 1/4", 5/16", 3/8", 1/2" (ea.)	1	$1.99	$1.99
Spur bit, 1/4" to 3/4", round shank	1	$20.96	$20.96

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Set boards, demonstration boards for rural electrification lesson plans published by TEA, shopmade	1	$110.00	$110.00
Plumb bob, 12 oz.	1	$13.98	$13.98
Miter box, 4" X 24", w/14 pt. saw	1	$66.88	$66.88
Bit brace, reversible ratchet, 10"	6	$73.65	$441.90
Desk brush or bench duster, 2-1/2" x 10"	5	$7.60	$38.00
Paint brush, 3"	2	$2.99	$5.98
Parts brush, cleaning	5	$1.99	$9.95
Sash brush, 1/2", 3/4", 1", 2" (each)	2	$2.19	$4.38
Steel brush, 1" width X 10-12" overall length	10	$2.36	$23.60
Steel brush, rotary wire, 8"	2	$26.57	$53.14
Cabinet for germicidal safety glasses or goggles	1	$553.00	$553.00
Cabinet for combustible material	1	$631.00	$631.00
Inside calipers, spring 8"	1	$14.72	$14.72
Outside calipers, spring 8"	1	$14.72	$14.72
File card, w/brush	5	$7.10	$35.50
Tow chain, 3/8" x 16' with hooks	1	$78.95	$78.95
Cape chisel, 1/2"	2	$7.95	$15.90
Cape chisel, roundnose, 1/2"	2	$5.60	$11.20
Cold chisel, 1/4" to 1" by 8ths (sets)	2	$33.63	$67.26
Cold or flat chisel, 5/8" (each)	4	$5.09	$20.36
Cold or flat chisel, 1" (each)	4	$6.59	$26.36

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Diamond point chisel, 1/2"	2	$5.60	$11.20
Wood chisel, 1/4" to 1" by 8ths (9 piece set)	1	$107.54	$107.54
Wood chisel, 1/2"	8	$10.50	$84.00
Bar or pipe clamp, adjustable, 3' to 8'	4	$41.42	$165.68
"C" clamp, 4"	6	$5.99	$35.94
"C" clamp, 6"	6	$8.28	$49.68
"C" clamp, 8"	6	$12.66	$75.96
"C" clamp, 10"	6	$15.50	$93.00
Hand screw clamp, 10" opening	8	$17.94	$143.52
Saw clamp	1	$11.87	$11.87
Slump cone, w/rod (for concrete work)	1	$37.50	$37.50
Cutting oil container, 1 gallon capacity	1	$4.09	$4.09
Gasoline container, safety, 5 gal. capacity	1	$37.49	$37.49
Oil container, squirt	6	$10.10	$60.60
Safety can container (waste oil materials)	1	$47.70	$47.70
Solvent container, 5 gal. capacity	1	$37.49	$37.49
Soldering copper, 1-1/2 lb., 2-1/2 lb., 4 lb., each	1	$23.40	$23.40
Soldering copper, electric 300 watts	1	$84.10	$84.10
Extension cord, 25', 14-3 wire, w/GFCI	2	$30.70	$61.40
Extension cord, 50', 14-3 wire, wGFCI	2	$43.80	$87.60
Bolt cutter, 3/8" capacity	1	$51.43	$51.43

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Glass cutter	6	$1.99	$11.94
Pipe cutter, 1-cutter, 1/2" to 2" capacity	1	$82.70	$82.70
Rod cutter, 1/8" to 5/8" capacity	1	$731.50	$731.50
Tubing cutter and flaring set, 3/16 " to 5/8"	1	$39.78	$39.78
Post hole digger	1	$43.43	$43.43
Spring-type divider, 8"	1	$14.72	$14.72
Spring-type divider, 10"	1	$15.63	$15.63
Architect's scale (drafting equipment)	10	$13.95	$139.50
Drafting board	10	$64.00	$640.00
Mechanical drawing sets (drafting)	10	$30.60	$306.00
T-square	10	$17.95	$179.50
Drafting triangle, 30-60 degrees	10	$3.45	$34.50
Drafting triangle, 45-90 degrees	10	$4.25	$42.50
Carborundum stick dresser	1	$9.99	$9.99
Diamond point dresser with guide	1	$252.40	$252.40
Huntington or star dresser	2	$6.99	$13.98
Wood drawknife, 10"	1	$32.10	$32.10
Automatic drill, push type w/points	4	$38.15	$152.60
Breast drill, 1/2" chuck	1	$73.25	$73.25
Hand drill, 1/4" or 1/2"	2	$61.70	$123.40
Star drill, 1/4" to 1" by 8ths			
1/2"	1	$5.10	$5.10
3/8"	1	$4.88	$4.88
5/8"	1	$5.52	$5.52
3/4"	1	$7.08	$7.08

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Twist drill, high speed, straight shank, 1/16" to 1/2" by 64ths (1 set)	1	$24.99	$24.99
Concrete edger	4	$8.00	$32.00
Dry chemical extinguisher, 20 lbs.	4	$39.95	$159.80
Screw extractor, 1/8" to 11/32", square shank, set	1	$5.29	$5.29
Assorted files, 4" to 12", mill, flat, round, square, auger, tapered, thread, and half-round (set of 20)	1	$106.62	$106.62
Concrete float (magnesium)	4	$17.55	$70.20
Bit guage, adjustable, 1/4" to 1"	1	$6.65	$6.65
Compression gauge, w/screw-in adapters	1	$30.29	$30.29
Drill guage, 1/16" to 1/2" by 64ths	1	$7.95	$7.95
Marking guage, 6" of graduation in 16ths	1	$7.55	$7.55
Sheet metal guage, U.S. standard, 0-36 guage	1	$13.90	$13.90
Spark plug guage, .015-.035, .035-.060	2	$3.45	$6.90
Tap and drill guage, 1/16" to 1/2"	1	$28.88	$28.88
Thickness guage, .0015 to .040, set	2	$21.99	$43.98
Thread guage for pitches from 4 to 84	1	$31.99	$31.99
Tool sharpening guage, 30, 59, 70 degrees	2	$6.65	$13.30
Tractor tire guage, combination, liquid and air	1	$5.29	$5.29
Vacuum guage, 0 to 30", pressure 0 to 10 lbs.	1	$19.45	$19.45

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Wire guage, American standard, 0 to 36 wire size	1	$15.99	$15.99
Welding gloves, leather	20	$12.99	$259.80
Oxy-acetylene goggles, 2 pairs for each bench	10	$9.99	$99.90
Safety glasses or goggles, 1 pair per student	20	$6.89	$137.80
Concrete groover, 1" depth groove	2	$8.65	$17.30
Caulking gun, cartridge type	1	$7.95	$7.95
Grease gun, lever operated, cartridge type	1	$19.25	$19.25
Paint gun, 1 qt. capacity w/50' hose and coupling	1	$179.87	$179.87
Soldering gun, 240/325 watts	1	$40.30	$40.30
Stapler gun, 1/4" to 3/8"	1	$14.95	$14.95
Ball pein hammer, 1/2 lb.	2	$9.49	$18.98
Ball pein hammer, 1 lb.	2	$11.48	$22.96
Ball pein hammer, 2 lb.	2	$14.44	$28.88
Brass hammer, 1 lb. or 1-1/2 lb.	1	$24.25	$24.25
Brick hammer, 1-1/2 lb.	1	$16.83	$16.83
Machinist or blacksmith hammer, 2-1/2 lb.	4	$9.13	$36.52
Nail hammer, bell faced, curved claw, 13 oz.	5	$19.12	$95.60
Nail hammer, bell faced, curved claw, 16 oz.	5	$19.12	$95.60
Nail hammer, bell faced, semi-rip, 16 oz.	2	$19.12	$38.24

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Nail hammer, bell faced, rip, 16 oz.	2	$26.02	$52.04
Plastic-tip hammer, 1 lb.	1	$7.44	$7.44
Sledge hammer, 6 or 8 lb.	1	$13.77	$13.77
Tack hammer, magnetic	1	$3.75	$3.75
Tinners hammer, setting, 12 oz.	1	$22.50	$22.50
File handle, 5"	10	$3.99	$39.90
Blacksmith hardie to fit anvil	1	$10.30	$10.30
Broad or half hatchet, 4"	1	$8.94	$8.94
Shingle hatchet	1	$16.95	$16.95
Chain hoist, 1-1/2 ton, w/A-frame	1	$396.00	$396.00
Water hose, w/fittings, 3/4" X 50'	2	$21.88	$43.76
Mortar hoe	1	$19.95	$19.95
Battery hydrometer	1	$4.59	$4.59
Hydraulic jack, portable, 8 ton	1	$25.99	$25.99
Hydraulic jack, portable, 2 ton floor (service jack)	1	$166.60	$166.60
First aid kit	1	$24.95	$24.95
Linoleum knife	1	$4.99	$4.99
Pruning knife	4	$4.99	$19.96
Putty knife, 1" blade	4	$3.70	$14.80
Putty knife, 3" blade	2	$5.61	$11.22
Extension ladder, 24' (wood)	1	$149.99	$149.99

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Step ladder, folding w/paint shelf, 8' (wood)	1	$70.50	$70.50
Testing lamp, 120/240 volts, shopmade	2	$10.00	$20.00
Trouble checking lamp, 25' cord, fixture guard w/3 conductors, h/duty, oil resistant, reel type	2	$39.95	$79.80
Carpenter level, aluminum, 24"	2	$18.32	$36.64
Farm level, set (tripod, target, and rod)	1	$533.00	$533.00
Mason level, wood, 48"	2	$39.95	$79.80
Timing light, ignition, power, 6 and 12 volts	1	$60.65	$60.65
Wood mallet, 1-1/2" X 5" head	10	$8.85	$88.50
Electric engraver marking took, 120 v, 60 cycle, AC w/cord	1	$16.92	$16.92
Ohm meter, volt, ampere-multimeter	1	$33.96	$33.96
Outside micrometer, 0" to 1"	1	$27.88	$27.88
Outside micrometer, 1" to 2"	1	$34.99	$34.99
Outside micrometer, 2" to 3"	1	$39.99	$39.99
Inside micrometer, 2" to 8"	1	$74.88	$74.88
End cutting nipper, 14"	1	$16.95	$16.95
Block plane, length, 6" to 7"	4	$18.93	$75.72
Jack plane, elngth, 12" to 16"	10	$41.88	$418.80
Jointer plane, length, 18" to 22"	1	$46.88	$46.88
Smoothing plane, length, 8" to 10"	6	$35.12	$210.72
Battery pliers, 8"	2	$10.50	$21.00

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Combination pliers, slip joint, 6"	10	$4.49	$44.90
Combination pliers, slip joint, 8" or 10"	4	$8.49	$33.96
Diagonal pliers, 6"	2	$11.12	$22.24
Ignition pliers	1	$13.49	$13.49
Lineman's pliers, 8"	8	$15.27	$122.16
Longnose pliers, 6"	8	$11.57	$92.56
Vise grip pliers	8	$9.30	$74.40
Vise grip pliers, welding	8	$14.82	$118.56
Wire pliers	4	$11.91	$47.64
Master puller set	1	$734.55	$734.55
Staple puller	1	$3.56	$3.56
Aligning punch, 10"	2	$6.49	$12.98
Aligning punch, 15"	2	$7.49	$14.98
Blacksmith punch w/handle, 1/4", 5/16", 3/8", 1/2" (each)	1	$63.59	$63.59
Center punch, 3/8"	4	$3.62	$28.96
Center punch, 1/2"	4	$3.62	$28.96
Pin punch, 1/8", 5/32", 3/16", 5/16", 3/8" (each)	2	$25.14	$50.28
Starting punch, 3/8", 1/2", 5/8", 3/4" each	2	$15.36	$30.72
Wood rasp, 10" to 12", flat and half-round	16	$7.74	$123.84
Burring reamer w/spiral flutes, pipe, 1/4" to 2"	1	$21.95	$21.95
Respirator, disposable type cartridge	2	$21.95	$43.90
Blacksmith rule, 36"	4	$2.99	$11.96

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Metal rule, 6" by 64ths	1	$1.86	$1.86
Wood rule, zig-zag, 6'	12	$15.30	$183.60
Push pull rule, steel rule, 6' to 12'	12	$9.51	$114.12
Back saw, 14 points	4	$12.12	$48.48
Compass saw, 12"	4	$5.43	$21.72
Coping saw	4	$5.39	$21.56
Hack saw, adjustable 10" to 12" frame	8	$7.49	$59.92
Hand saw, crosscut, 8 points	10	$14.16	$141.60
Bow saw, tubular steel frame, 36" blade	1	$10.95	$10.95
Hand saw, crosscut 10 points	10	$14.16	$141.60
Hand saw, rip, 6 points	2	$14.16	$28.32
Industrial trimmers, 12" (scissors)	1	$9.08	$9.08
Cabinet scraper, 3"	2	$7.00	$14.00
Carbon scraper	1	$3.15	$3.15
Electrician scraper, 6"	4	$4.85	$19.40
Gasket scraper	1	$6.00	$6.00
Sand screen (for concrete work)	1	$36.95	$36.95
Cabinet screwdriver, 3" (round shank)	3	$3.10	$9.30
Cabinet screwdriver, 4" (round shank)	3	$5.19	$15.57
Cabinet screwdriver, 6" (round shank)	3	$6.14	$18.42
Offset screwdriver, 6" to 8"	2	$3.29	$6.58
Phillips screwdriver, set no. 1, no. 2, no. 3	2	$8.49	$16.98

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Ratchet screwdriver, spiral, w/3 blades	1	$17.49	$17.49
Short screwdriver, shockproof (stubby)	2	$2.47	$4.94
Standard screwdriver, shockproof, 4" (square shank)	4	$3.15	$12.60
Standard screwdriver, shockproof, 6" (square shank)	4	$4.15	$16.60
Standard screwdriver, shockproof, 10" (square shank)	1	$6.69	$6.69
Handsaw set, adjustable	1	$9.95	$9.95
Nail set, 1/32", 1/16", 3/32", 1/8" each	4	$1.99	$7.96
Rivet set, diameters 1/8 " to 5/16"	1	$68.35	$68.35
Stencil set, 1/2", 1", 2", & 3" letters	1	$43.39	$43.39
Flexible shaft, h/duty, w/1/2" core, spindle w/ 1/2" X 20" thread, fits 1/2" or 3/8" motor shaft, one hp capacity, 2725 or 3450 rpm w/4" wheel guard	1	$39.95	$39.95
Metal shear, capacity 3/4" rounds, 4" X 1/2" mild steel, knives 7" long. One set of extra knives.	1	$495.00	$495.00
Eye shield, clear visor	5	$13.15	$65.75
Grain scoop shovel	2	$27.24	$54.48
Round nose shovel w/long handle	2	$9.95	$19.90
Sharp shooter shovel	4	$16.11	$64.44
Square point shovel	4	$9.95	$19.90
Tin snips, curved, 14"	1	$14.47	$14.47
Tin snips, duckbill, 14"	1	$14.30	$14.30

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Tin snips, straight, 14"	4	$14.25	$57.00
Carpenter square w/rafter table	10	$12.00	$120.00
Combination try square and miter, 9" protractor head and 1 centering head	10	$7.12	$71.20
Try square, 6" wood or metal handle	5	$15.84	$79.20
Steel stamp, letters A to Z, 1/4", set	1	$26.49	$26.49
Steel stamp, numerical 0 to 9, 1/4", set	1	$10.49	$10.49
Pipe stock and die, ratchet threading set, 1/8", 1/4", 3/8", 1/2", 3/4", 1", 1-1/4", 1-1/2", 2"	1	$233.67	$233.67
Oil stone, combination	5	$10.95	$54.75
Wire stretcher	1	$26.99	$26.99
Tachometer, speed 0-5000 rpm; w/dwell angle attachment	1	$295.60	$295.60
Steel tape, flexible, 100'	1	$14.37	$14.37
NC and NF tap and die, screw plate set, 1/4" to 1"	1	$264.99	$264.99
Blacksmith tongs, curved lip	1	$51.50	$51.50
Blacksmith tongs, straight lip for rounds 1/4", 3/8", and 1/2" set	1	$49.50	$49.50
Propane torch	1	$15.95	$15.95
Brick trowel, 5" X 10"	4	$16.65	$66.60
Concrete finishing trowel, 16"	4	$21.15	$84.60
Plastering trowel, 5" X 12"	4	$14.39	$57.56
Blacksmith or mechanic vise, 7"	1	$59.95	$59.95
Drill press vise, 6" opening	2	$35.30	$70.60

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Machinist vise, solid base, 3" jaw	10	$125.11	$1,251.00
Machinist vise, swivel base, 4" jaw	2	$169.89	$359.78
Pipe vise, 1/8" to 3" capacity	2	$27.50	$55.00
Woodworking vise, 5" to 8"	20	$79.87	$1,597.40
Electric arc welder (see power tools)			
Oxy-acetylene, complete w/regulators, wye connections, welding torches, and nozzles, cutting attachments and tips, heatig nozzles hoses, and cylinder trucks	5	$319.99	$1,599.95
Sparklighters	5	$2.79	$13.95
Tip cleaners	5	$3.99	$19.95
Wrenches, torch	5	$6.39	$31.95
Contractor's wheelbarrow, 4-6 cu. ft. capacity, heaped	1	$105.90	$105.90
Adjustable end wrenche, 4", 6", 8", 10", 12", and 15" set	1	$102.00	$102.00
Allen wrenches, head type set screw, sets, (short arm, .050, 1/16", 5/64", 3/32", 7/64"), (long arm, 7/64", 1/8", 19/64", 5/32", 3/16", 7/32", 1/4", 5/16") each	5	$4.99	$24.95
Basin wrenches, self adjusting, forged steel jaws w/return spring 11" handle	1	$16.30	$16.30
Combination wrenches, set, standard 12 point, 3/8" to 1-1/8" by 16ths, 13 wrenches	2	$49.01	$98.02
Ignition wrenches, set of 6 wrenches	1	$52.30	$52.30
Pipe wrenches, set 10", 14", 24"	1	$113.82	$113.82

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Socket wrenches, set, 12 point, 1/2" drive, 7/16" to 1-1/8" by 16ths, 18" hings handle, extensions 5" and 10" and 10" ratchet	1	$93.18	$93.18
Socket wrenches, set 6 point, 1/2" drive, 1/2", 9/16", 5/8", 3/4" w/socket driver	1	$34.74	$34.74
Socket wrenches, set 6 point, 1/4" drive, 1/4" to 1/2" w/socket driver	1	$23.43	$23.43
Socket wrenche set, 12 point, 3/8" drive, 3/8" to 3/4" by 16th, w/ratchet, speed handle and universal joint, 8" hinge handle, and extensions 3", 8", and 12"	1	$78.67	$78.67
Scket wrench set, deep, 12 point, 3/8" drive, 3/4", 13/16", and 7/8"	2	$12.57	$25.14
Tappet wrench, 7/16" to 7/8" by 16ths	1	$63.90	$63.90
Torque wrench, 0 to 150 inch pounds, 3/8" drive	1	$46.30	$46.30
Torque wrench, 0 to 150 foot pounds, 1/2" drive	1	$46.30	$46.30
Power Tools (These tools must be high quality and of an industrial or commercial type.)			
Battery charger, 6 adn 12 volts, slow charge	1	$155.00	$155.00
Metal and/or pipe bender, 1/2" to 2", hydraulic power, heavy duty (table optional)	1	$635.10	$635.10
High pressure cleaner, wash or steam	1	$1,560.00	$1,560.00
Vacuum cleaner, shop, heavy duty	1	$375.20	$375.20
Air compressor, electric, stationary, 5 hp., 80 gal. tank or smaller, 24 cfm. displacement or less	1	$1,099.99	$1.099.99

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Portable drill, electric, 1/4:", heavy duty, variable speed	3	$106.39	$319.17
Portable drill, electric, 3/8", heavy duty, variable speed	1	$114.24	$114.24
Portable drill, electric, 1/2" heavy duty, w/key locking chuck	1	$142.80	$142.80
Drill press, heavy duty, variable speed, 1/2" chuck	2	$829.48	$1,658.96
Grinder, bench type, 1/2 hp. electric motor w/7" wheels and accessories	2	$120.80	$241.60
Grinder, pedestal, 1 hp. electric motor w/10" wheels and accessories	1	$741.70	$741.70
Portable grinder, electric	2	$94.95	$189.90
Jointer, 6" or 8", complete with guard, fence, stand, and motor	1	$1,162.72	$1,162.72
Concrete mixer, 3-4 cu. ft. capacity w/1/2 hp. electric motor	1	$1,492.50	$1,492.50
Metal cutting nibbler	1	$400.40	$400.40
Wood planer, 10" to 16", complete w/motor and table (13")	1	$1,199.95	$1,199.95
Portable router, electric	1	$174.93	$174.93
Portable belt sander	1	$221.34	$221.34
Portable vibrator sander	1	$139.23	$139.23
Vertical wood cutting saw, 12" or larger w/motor and stand	1	$790.34	$790.34
Circular saw, 10" or 12", tilting arbor	1	$899.00	$899.00
Microscopes	10	$377.00	$3770.00

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Band saw, metal cutting, capacity, 6" x 10" rectangular stock, 9" round stock, 3" X 16" flat stock, heavy duty	1	$875.00	$875.00
Abrasive cut-off saw, 10" to 16" wheel, minimum cutting capacity 1" solid round 2" pipe, 2 to 7-1/2 hp. motor, either single or three phase	1	$1,505.35	$1,505.35
Portable electric hand saw, 7" blade	2	$129.95	$259.90
Portable sabre saw (Bayonet), industrial type	1	$183.20	$183.20
Radial arm saw, 10" to 14" blade	1	$1,900.00	$1,900.00
Electric arc welder, AC or AC/DC (225 amps, minimum w/accressory kit)	10	$419.99	$4,199.90
Electric arc welder, stationary or portable, electric or manual start, 200 to 300 amps. (DC or AC/DC w/ accessory kit)	1	$2,599.99	$2,.599.99
GMA gas metal are (MIG) welder, single or three phase, 60 cycle, minimum 200 amps., wire feeder, gun and power cable, CO2 flow meter, power cord, and chassis	1	$1,529.50	$1,529.50
GTA, gas tungsten arg (TIG) welder, single or three phase, 60 cycle, minimum 250 amps., AC/DC high frequency, w/flowmeter, minimum 200-300 amps. water-cooled gun (if AC/DC welder is available in farm shop, the add-on GTA (TIG) high frequency unit may be purchased in place of the above unit)	1	$2,983.00	$2,983.00
Plasma cutter, 20 amp., 0-100 psi air pressure regulator, 208/230 v, 35/31 primary amps.	1	$1,140.00	$1,140.00
Carbon-arc torch	1	$31.99	$31.99
Slag hammers (1 each station)	10	$11.89	$118.90

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Helmets, lift front, arc welding (2 each station)	20	$17.99	$359.80
Impact wrench, electric or air, 0 to 200 ft. pounds, 1/2" drive	1	$59.95	$59.95
Equipment			
Woodworking bench, wod top w/4 woodworking vises on each bench (approximate size 54" X 64" X 32-1/4"	5	$1,160.80	$5,804.00
Metalworking bench, metal top w/2 machine vises (approximate size 6' X 30" X 32")	4	$687.00	$2,748.00
Tool cabinet, wall	2	$355.00	$710.00
Small Gasoline Engine Tools and Equipment			
Gasoline engine, small (two and four cycle) (horizontal shaft for four cycle)	10	$179.50	$1,795.00
Small hole guage, 1/8" to 1/2" set	1	$59.30	$59.30
Telescoping guage, 1/2" to 4"	1	$46.45	$46.45
Gear puller, small, 2-3 jaw	1	$18.00	$18.00
Coil tester	1	$69.95	$69.95
Torque wrench, 1/4" or 3/8" drive w/adapters, 0 to 150 inch pounds	1	$46.30	$46.30
Small engine tool kit (2 reamers, 3 plug guages, 1 tester, 1 bushing driver and reamer, 1 oil plunger driver and reamer, 2 jet screwdrivers, 1 valve spring compressor, 1 piston ring compressor, 1 clutch wrench, 3 assorted flywheel pullers, flywheel holder, and pilot bushing)	10	$2,219.50	$2,219.50

ITEM	RECOMMENDED QUANTITY	COST PER UNIT	TOTAL COST
Engine Equipment			
Cold chisel, 1/2" cut	10	$3.75	$37.50
Nut driver, 1/4", 5/16", 7/16" (each)(set)	10	$29.45	$294.50
Piston ring expander	10	$8.70	$87.00
Feeler guage	10	$6.10	$61.00
Spark plug guage	10	$3.30	$33.00
Ball pein hammer, 1/2 lb.	10	$9.49	$94.90
Plastic tip hammer	10	$7.44	$74.40
Combination pliers, 7"	10	$6.59	$65.90
Needle nose pliers, 7"	10	$12.95	$129.50
Long nose pliers, 7"	10	$10.95	$109.50
Brass punch, 1/2" X 6"	10	$8.95	$89.50
Steel punch, 5/16"	10	$5.00	$50.00
Phillips screwdrivers, 4"	10	$2.99	$29.90
Phillips screwdrivers, 6"	10	$3.50	$35.00
Standard screwdrivers, 6"	10	$4.79	$47.90
Standard screwdrivers, 8"	10	$5.59	$55.90
Combination wrenches, 3/8", 7/16", 9/16", 1/2" set	10	$34.15	$341.50
Socket wrench set, 6-12 point, 3/8" drive, 1/4" to 13/16" by 16ths, extension 3", hinge handle	10	$86.45	$864.50
Socket wrench set, 3/8" drive, spark plug, 3/4", 13/16", 7/8", speed handle	10	$54.20	$542.00

SUPPLIES AND EQUIPMENT THAT MAY BE NEEDED FOR TEACHING THE 2+2+2 AGRISCIENCE TECHNOLOGY PROGRAM IN DAIRY PRODUCTS MANAGEMENT

In addition to the tools and equipment previously listed, the supplies and equipment listed below are necessary to develop skills and competencies needed by students.

1	Tattoo Set
4	Cattle-weighing Tapes
1	Balling Gun
2-3	Gallon pressure sprayers
4	Vaccinating Syringes and Assorted Needles (2) 50 cc Syringe Capacity and (2) 10 cc Capacity
2	Dose Syringes 5-10 oz. size
1	Veterinary Thermometer
1	Trocar with Cannula
4	Castrating Knives
100'	Manila Rope-1/2"
4	Hoof Trimmers
2	Emasculators
1	Burdizzo, Medium Size
1	Electric Clipper with Shearing Head
1	Hand Clipper
6	Pair rubber gloves
1	Keystone Dehorner
1	Calf Dehorner
1	Electric Dehorner
1	Chemical Dehorner
1	Dehorning Saw
1	Bull Ringer
1	Set of insect and parasite mounts
2	Livestock Show Boxes
2	Curry Combs
2	Cattle Brushes
1	Dissecting set
1	Surgical scissors
1	Soil Auger, 2" Bit, 40" Shank
1	Soil Testing Kit Including: Nitrogen Tester, Phosphate Tester, Potash Tester, pH Tester, Test Tubes, Reagents, and Filters
1	Plant Tissue Testing Kit
1-5	Bostrum No. 2 Farm Level with Tripods and Targets
1	Farm Level, Target, and Rod
1	Chain Tape, 100'
1	Set of Samples of Good Seed for Each Crop of Economic Importance in the Community
4	Insect Killing Jars
1	Soil Thermometer

ADDITIONAL DAIRY TOOLS AND EQUIPMENT - CONTINUED

1	Set of Grass and Legume Mounts
1	Soil Profile - Homemade of Typical Soil
1	Set of Fertilizer Samples
1	Set of Topsoil Samples
1	Specimen of Each Crop Plant from Rich and Poor Soil
1	Set of Samples of Soil-Building Crop Seed, Such as Legumes
1	Set of Legume Innoculants
1	Rain Gauge
1	Dust gun, eight pound capacity
2	Respirators
1	Set of classes and grades of feed, seed, and fiber products of economic importance in the community
1	Antibiotic Test Kit
	Teat Cups - Various
	Claws - Various Models
	Inflations - Various Models
1	Portable Milking Machine
1	Subscription - Hoard's Dairyman
1	Subscription - Dairyman's Digest

Visual Aids Equipment:

16mm movie projector
35 mm film strip - slide projector
Nonreflective screen for overhead projector
Reflective screen for movie projector
35mm camera
Video tape equipment - recording and playing
Computers (8)
Overhead projector
Video camcorder

XI. COMPETENCY PROFILE

The following competency profile will be completed at the secondary level for those competencies achieved by the student during grades 11 - 12.

The profile will then be sent to the postsecondary institution where it will be updated as the student progresses.

Upon graduation from the postsecondary institution, a copy of the profile will have the college seal affixed, and will be provided to the student for presentation to a proposed employer.

COMPETENCY PROFILE

Secondary School ____________________ Postsecondary School ____________________

Agriculture 2+2 Program Area - Dairy Products Management Career Goal ____________________

Name ____________________ Social Security Number ______________ Age ________

Address ____ Date of Birth ______________

Phone Number ____________________ Sex ________ Racial/Ethnic Designation ______________

Parent's Name ____ Phone Number ______________

Secondary Agriculture Courses Completed

Name of Course	Date Completed		
	Month	Day	Year
AGSC 101 Introduction to World Agricultural Science and Technology			
AGSC 102 Applied Agricultural Science and Technology			
AGSC 221 Introduction to Agricultural Mechanics			
AGSC 231 Animal and Plant Production			
AGSC 311 Agribusiness Management and Marketing			
AGSC 312 Personal Skill Development in Agriculture			
AGSC 321 Agricultural Structures Technology			
AGSC 323 Agricultural Power Technology			
AGSC 332 Animal Science			
AGSC 333 Plant and Soil Science			
AGSC 241 Food Technology (Optional)			
AGSC 222 Home Maintenance and Improvement (Optional)			

Postsecondary Agriculture Courses Completed

Name Of Course	Date Completed		
	Month	Day	Year
AGRI 1303 Animal Nutrition and Feeding			
AGRI 1304 Animal and Poultry Health Management			
AGRI 1350 Computers in Agriculture			
AGRI 1443 Agricultural Economics			
AGRI 2308 Cooperative Education			
AGRI 2363 Forage and Pasture Crops			
AGRI 2371 Dairy Science			
AGRI 2372 Dairy Management			
AGRI 2406 Genetics			
AGRI 2483 Reproductive Physiology			
FOOD 2313 Technology of Food Processing			
FOOD 2400 Introductory Food Science			

COMMENTS: ____

____

____

____

Directions: Evaluate the student using the rating scale below. Check the appropriate number to indicate the degree of competency. The rating for each of the tasks should reflect job readiness.

Rating Scale:
4 Skilled - can work independently with no supervision
3 Moderately Skilled - can perform job completely with limited supervision
2 Limited Skill - requires instruction and close supervision
1 No Exposure - no experience or knowledge in this area

A. MILKING,SANITIZING,AND MAINTAINING THE EQUIPMENT

4	3	2	1	
				1. Sanitize the milking system
				2. Assemble milking equipment
				3. Prep the cow for milking
				4. Milk the Cow with the Milking Machine
				5. Monitor feed and milk cooling equipment
				6. Clean the milking system
				7. Maintain milking system

B. MAINTAINING DAIRY HERD HEALTH

4	3	2	1	
				1. Identify ailments in order to obtain timely treatment
				2. Administer medication and vaccinations
				3. Sterilize tools and equipment
				4. Store medicines/chemicals
				5. Control parasites
				6. Take an animal's temperature
				7. Perform in-barn mastitis test
				8. Keep health records on dairy animals
				9. Inventory medical and chemical supplies
				10. Test milk for antibiotics

C. BREEDING

4	3	2	1	
				1. Examine & treat reproductive system for breeding
				2. Detect heat
				3. Artificially inseminate cows and heifers
				4. Handmate cows and heifers
				5. Manage Sires
				6. Record breeding data
				7. Store semen and maintain breeding supplies
				8. Pregnancy test bred cows and heifers

D. HANDLING AND CARING FOR MILKING HERDS ACCORDING TO PRODUCTION

4	3	2	1	
				1. Check udder health
				2. Monitor eating and milk production
				3. Sort cows into herds
				4. Segregate incompatible animals
				5. Dry off cows

E. HANDLING AND CARING FOR THE DRY HERD

4	3	2	1	
				1. Manage dry cows
				2. Assist with calving
				3. Produce healthy newborn calves
				4. Remove extra teats

F. HANDLING AND CARING FOR THE REPLACEMENT HERD

4	3	2	1	
				1. Manage baby calves 0-8 weeks
				2. Manage calves 200-500 pounds
				3. Identify animals
				4. Dehorn animals

G. FORMULATING AND FEEDING RATIONS

4	3	2	1	
				1. Identify & regulate access to feedstuffs causing off-flavored milk
				2. Classify feedstuffs to nutritive value
				3. Calculate nutritional requirements for animals
				4. Mix & test feed ingredients to meet animal & ration requirements
				5. Weigh animals
				6. Feed animals
				7. Clean feed and water troughs
				8. Provide adequate water

H. PRODUCING FORAGES

4	3	2	1	
				1. Design and follow a soil conservation plan
				2. Prepare the seedbed
				3. Plant forages
				4. Control Diseases
				5. Control Pests
				6. Control Unwanted Plants
				7. Determine harvest time and harvest forages
				8. Store forages

I. OPERATING AND MAINTAINING NON-MILKING EQUIPMENT AND TOOLS

4	3	2	1	
				1. Remove or add ballast weights to tractors
				2. Attach farm equipment to the drawbar
				3. Operate equipment
				4. Store equipment
				5. Perform seasonal preventative maintenance
				6. Perform daily preventative maintenance on equipment
				7. Replace universal joints
				8. Maintain tires
				9. Bleed diesel fuel systems
				10. Change fuel filters
				11. Change oil and oil filter
				12. Flush and clean radiator
				13. Replace thermostats
				14. Replace radiator hoses
				15. Install V-belts on pulleys
				16. Install and adjust pulleys on motors
				17. Install electric motor
				18. Reverse electric motor
				19. Service electric motors
				20. Install and adjust roller chains
				21. Install engine batteries
				22. Service engine batteries
				23. Service wheel or in-line bearings
				24. Maintain tools
				25. Adjust safety shields
				26. Calibrate equipment

J. MARKETING PRODUCTS AND ANIMALS

4	3	2	1	
				1. Market dairy animals/products
				2. Transport animals
				3. Verify production records

K. HANDLING AND DISPOSING OF ANIMAL WASTE

4	3	2	1	
				1. Manage and remove solid and liquid waste
				2. Apply wastes to fields

L. ASSIST IN SELECTING BREEDING ANIMALS

4	3	2	1	
				1. Cull animals
				2. Select foundation stock
				3. Select purchased and self-raised replacement stock
				4. Select sires

M. MAINTAINING BUILDINGS AND STRUCTURES

4	3	2	1	
				1. Construct and install doors
				2. Hang sliding doors
				3. Hang hinged doors
				4. Paint wood surfaces
				5. Paint metal surfaces
				6. Apply creosote or other wood preservatives
				7. Patch roofs
				8. Install window panes
				9. Weld metal using arc welder
				10. Weld metal using oxy-acetylene unit
				11. Cut metal using oxy-acetylene unit
				12. Construct and maintain wooden fence
				13. Construct and maintain wire fence
				14. Construct and maintain electric fence
				15. Construct and maintain gates
				16. Hang Gates
				17. Wire simple electric circuits
				18. Connect electric switch
				19. Connect lighting fixture
				20. Attach plug and receptacle to electrical drop cord
				21. Replace fuses
				22. Reset circuit breakers
				23. Maintain a water system
				24. Pour concrete floor
				25. Construct block walls
				26. Extinguish fires
				27. Maintain ventilation equipment in dairy barns
				28. Paint buildings

N. MANAGING HAZARDOUS MATERIALS

4	3	2	1	
				1. Storing hazardous materials
				2. Using hazardous materials
				3. Disposing of hazardous materials
				4. Managing dioxins

O. MANAGING THE BUSINESS

4	3	2	1	
				1. Maintain health records on dairy animals
				2. Inventory supplies
				3. Maintain animal production records
				4. Maintain pedigree records
				5. Maintain equipment records
				6. Maintain forage production records

P. PREPARING FOR OWNERSHIP

4	3	2	1	
				1. Calculate Interest Costs
				2. Formulate Feasible Repayment Schedule
				3. Prepare a Cash Flow Budget for the Dairy Enterprise
				4. Develop and negotiate a credit plan for the farm business
				5. Calculate and record assets
				6. Calculate and record liabilities
				7. Calculate and record expenses
				8. Calculate net income
				9. Calculate amount of life insurance needed
				10. Calculate and record depreciation
				11. Calculate and record net worth of farm businesses
				12. Fill out income tax form: income or loss
				13. Fill out federal income tax capital gains or loss
				14. Fill out federal income tax investment credit schedule
				15. Fill out federal income tax FICA schedule
				16. Complete federal income tax form 1040
				17. Hire workers
				18. Dismiss workers
				19. Develop a plan for amount of labor needed
				20. Develop and assign work schedules
				21. Comply with employers legal requirements
				22. Train employees
				23. Develop written work agreements
				24. Evaluate work performance
				25. Develop production goals
				26. Comply with industry production standards
				27. Analyze trends in dairy product demand
				28. Contract for professional management services
				29. Develop plan for bestowing the estate
				30. Calculate and record labor management income

Q. STARTING UP HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION PROCESS

4	3	2	1	
				1. Inspect equipment prior to start-up
				2. Adjust equipment for start-up
				3. Prepare data recording equipment
				4. Start up high-temperature, short-time pasteurization

R. PROCESSING HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

4	3	2	1	
				1. Monitor pasteurization process
				2. Adjust equipment for high-temperature, short-time processing
				3. Record high-temperature, short-time processing data
				4. Put product into storage tank

S. PERFORMING PRODUCT-TO-PRODUCT CHANGEOVER

4	3	2	1	
				1. Prepare lines and valves to bring new product to balance tank
				2. Adjust equipment for product changeover
				3. Complete product changeover process

T. PERFORMING PRODUCT CHANGEOVER REQUIRING FLUSH-OUT

4	3	2	1	
				1. Operate lines following established sequence
				2. Set recording data equipment for changeover/flush-out
				3. Perform flush-out procedures
				4. Inspect equipment for proper operation
				5. Complete product changeover process

U. SHUTTING DOWN HIGH-TEMPERATURE, SHORT-TIME PASTEURIZATION

4	3	2	1	
				1. Prepare high-temperature, short-time for shut-down
				2. Shut down high-temperature, short-time system
				3. Inspect recording data equipment

V. CLEANING THE HIGH-TEMPERATURE, SHORT-TIME PASTEURIZER

4	3	2	1	
				1. Inspect and adjust equipment and lines for cleaning
				2. Perform cleaning procedures
				3. Inspect equipment

W. APPLYING SAFETY PRACTICES

4	3	2	1	
				1. Comply with shop and equipment safety rules
				2. Apply basic emergency first aid techniques
				3. Complete accident report
				4. Inspect work area and equipment for safe working
				5. Use fire extinguisher
				6. Correct safety hazards
				7. Demonstrate cardiopulmonary resuscitation (CPR)
				8. Comply with safety requirements for working around automated systems
				9. Participate in safety training program

XII. STUDENT MONITORING AND FOLLOW-UP

The following student monitoring and follow-up instrument is the one that will be used to monitor and follow the student one year after graduation from the postsecondary institution.

At the present time, the 2+2 User's Group is considering adopting an instrument to be used for all 2+2 programs. At the time of this report that has not taken place.

Northeast Texas Community College
Project LONESTAR
Statistical Information Request

What is your **primary** reason for attending Northeast Texas Community College? (please check one)

☐ 1. Get a Job
☐ 2. Improve Skills Needed in Current Job
☐ 3. Get a Better Job
☐ 4. Maintain Licensure
☐ 5. Earn a Certificate
☐ 6. Earn a Two-Year Degree
☐ 7. Earn Credit to Apply to a Four-Year Degree
☐ 8. Personal Enrichment
☐ 9. Other

How long do you plan on being at Northeast Texas Community College? (please check one)

☐ 1. One Semester Only
☐ 2. Two Semesters
☐ 3. One Year
☐ 4. Two Years
☐ 5. Three Years
☐ 6. More Than Three Years

What is your current employment status? (please check one)

☐ 1. Employed Full-time (40 hours or more per week)
☐ 2. Employed Part-time (Less than 40 hours per week)
☐ 3. Employed as a Homemaker
☐ 4. Not Employed, Seeking Work
☐ 5. Not Employed, Not Seeking Work

What is your **previous** college-level academic experience? (please check one)

☐ 1. None
☐ 2. Some Postsecondary Education
☐ 3. Postsecondary Award, Certificate, or Diploma
☐ 4. Associates' Degree
☐ 5. Bachelor's Degree
☐ 6. Master's Degree
☐ 7. Doctoral Degree
☐ 8. First-professional Degree

If you consider yourself to be in any of the following categories, please check one.

☐ 1. Handicapped
☐ 2. Limited English Proficiency
☐ 3. Single Parent/Homemaker
☐ 4. Learning Disability
☐ 5. Culturally Disadvantaged
☐ 6. Academically Disadvantaged
☐ 7. Economically Disadvantaged
☐ 8. Physical Disability
  ☐ Deaf
  ☐ Deaf-Blind
  ☐ Hard of Hearing
  ☐ Orthopedically Impaired
  ☐ Other Health Impaired
  ☐ Speech Impaired
  ☐ Visually Handicapped

How did you receive your schedule of classes? (please check one)

☐ 1. Called NTCC and it was mailed to you.
☐ 2. Came by NTCC and picked it up.
☐ 3. Newspaper insert.
☐ 4. Other________________________________.

Describe the highest level of formal education obtained by your father. (please check one)

☐ 1. Not a high school graduate
☐ 2. High school graduate
☐ 3. Some college or associate's degree
☐ 4. Bachelor's degree or above

Describe the highest level of formal education obtained by your mother (please check one)

☐ 1. Not a high school graduate
☐ 2. High school graduate
☐ 3. Some college or associate's degree
☐ 4. Bachelor's degree or above

TX8-1-F (NRS-DeVAULT)   Term:

Tex-SIS FOLLOW-UP

PROJECT FOLLOW-UP

Please make corrections to the information above if necessary

-1
-44

FOR COLLEGE USE ONLY

Term Date
Mo ☐ ☐ Yr ☐ ☐
16 17 20 21

Completion Code ___ 73

Course Type Code
74- 1 ☐ Coop
2 ☐ Non-Coop

Group Code
33- A ☐ O/T
B ☐ LT
C ☐ OTH
D ☐ VC

Target Pop. Code
1 ☐ REG
2 ☐ DAVT
3 ☐ HNCP
4 ☐ LEP
5 ☐ SP/HOME
6 ☐ SB/STER

Major Code
34 35 36 37 38 39

Level Code
76- 2 ☐ Postsecondary
3 ☐ Adult-LT
4 ☐ Adult-ST
5 ☐ OTH

Special Code ☐
63

Note: This survey is authorized by Public Laws 20 USC 2312 and 20 USC 2391. While you are not required to respond to this survey your cooperation is needed to insure that the results of this effort are comprehensive, reliable, and timely.

PLEASE CHECK APPROPRIATE BLOCK(S) WITHIN EACH CATEGORY BELOW.

SECTION A

EVERYONE SHOULD ANSWER THIS SECTION

Do not write in this column

Please respond to the below as appropriate. This information is needed for equal opportunity education and employment reporting.

MAJOR ______________________

(at our college)

SEX
65- M ☐ Male
F ☐ Female

ETHNIC GROUP
66- 1 ☐ American Indian or Alaskan Native
2 ☐ Asian or Pacific Islander
3 ☐ Black, not of Hispanic Origin
4 ☐ Hispanic
5 ☐ White, not of Hispanic Origin

AGE
67- B ☐ [illegible]-19
C ☐ 20-24
D ☐ 25-29
E ☐ 30-34
F ☐ 35-44
G ☐ 45-54
H ☐ 55-64
I ☐ 65 and over

1 **What was your PRIMARY objective in attending our two-year college?**

46-1 ☐ Improvement of existing "job skills"
47-1 ☐ Preparation for "job to be obtained"
48-1 ☐ University transfer credit
49-1 ☐ Personal interest
50-1 ☐ Other (describe) ______________________

2 **To what extent has this objective been completed?**

51- 1 ☐ Fully completed
2 ☐ Partially completed
3 ☐ Not completed

3 **Do you plan to pursue this objective further?**

52- 1 ☐ Yes, where? ➧
2 ☐ No

53-1 ☐ At our college
54-1 ☐ At another college
55-1 ☐ Other (describe) ______________________

4 **How much education is (or was) required to accomplish your educational objective at our college?**

56-1 ☐ Selected course(s)
57-1 ☐ Certificate program
58-1 ☐ Two-year associate degree program
59-1 ☐ Other (describe) ______________________

5 **What was your principal reason for NOT re-enrolling at our college this semester?**

60-1 ☐ Completed needed courses
61-1 ☐ Transportation problems
62-1 ☐ Transferred to another college
63-1 ☐ Found job in occupation related to course(s) completed at this college
64-1 ☐ Conflicting job hours
65-1 ☐ Financial reasons
66-1 ☐ Change of residence
67-1 ☐ Grade problems
68-1 ☐ Dissatisfied with instruction
69-1 ☐ Dissatisfied with content of courses
70-1 ☐ Personal/family illness or injury
71-1 ☐ Other personal/family reasons
72-1 ☐ Other (describe) ______________________

6 **Which statement best describes your feeling about your educational experience at our college?**

Do not write in this column

73- 1 ☐ Very satisfied
2 ☐ Satisfied
3 ☐ Average
4 ☐ Disappointed
5 ☐ Very disappointed

7 **If you have completed courses in your MAJOR FIELD OF STUDY please rate them according to how well they fulfilled your individual needs. Students with "undecided/undeclared" majors should skip to next question.**

		Very Good 1	Good 2	Average 3	Poor 4	Very Poor 5
a Quality of instruction	74-	☐	☐	☐	☐	☐
b Grading/testing	75-	☐	☐	☐	☐	☐
c Instructor interest	76-	☐	☐	☐	☐	☐
d Content of course(s)	77-	☐	☐	☐	☐	☐
e Instructional media	78-	☐	☐	☐	☐	☐
f Class size	79-	☐	☐	☐	☐	☐

8 **If you have used any of the below college services, please rate them according to how well they fulfilled your individual needs.**

		Very Good 1	Good 2	Average 3	Poor 4	Very Poor 5
a Financial aids	34-	☐	☐	☐	☐	☐
b Counseling	35-	☐	☐	☐	☐	☐
c Job placement services	36-	☐	☐	☐	☐	☐
d Course advisement	37-	☐	☐	☐	☐	☐
e Tutoring services	38-	☐	☐	☐	☐	☐
f Veterans services	39-	☐	☐	☐	☐	☐
g Learning lab. packages	40-	☐	☐	☐	☐	☐
h Student activities	41-	☐	☐	☐	☐	☐
i Library services	42-	☐	☐	☐	☐	☐

9 **Do you currently have a college degree or certificate?**

DMA ☐ ☐ ☐ ☐ ☐ ☐

73- ☐ Yes, what? ➡
☐ No

74- 1 ☐ Certificate
2 ☐ Associate Degree
3 ☐ Bachelor's
4 ☐ Master's
5 ☐ Doctorate
6 ☐ Other ______________________

(Degree or Certificate Field of Study)
____

10 **What is your current educational status? (Check one)**

43- 1 ☐ Currently attending school
2 ☐ Not currently attending school

11 **What is your current employment status? (Check one)**

44- 1 ☐ Employed (Includes all employment, even if below your qualifications; **does not include full-time military service**)
2 ☐ Employed (Full-time military service)
3 ☐ Unemployed (Not employed, but actively seeking employment)
4 ☐ Not in labor force (Not employed and not seeking employment because of choice, illness, full-time student status, retirement, pregnancy, or other such reason)

OVER PLEASE!

BELOW SPACE RESERVED FOR COMMENTS

BEST COPY AVAILABLE

MAJOR   CODE ___ ___ ___ ___ ___ ___

SECTION B

IF YOU ARE CURRENTLY EMPLOYED, OR IN FULL-TIME MILITARY SERVICE, PLEASE ANSWER THIS SECTION. OTHERWISE, SKIP TO SECTION C.

Do not write in this column.

SIC 45 ☐ 46 ☐ 47 ☐
EJT 48 ☐ 49 ☐ 50 ☐ 51 ☐ 52 ☐ ☐ ☐ ☐ ☐
SI 63 ☐ 64 ☐ 65 ☐ 66 ☐ 67 ☐ 68 ☐ 69 ☐
HR 71 ☐ 72 ☐
SJT 34 ☐ 35 ☐ 36 ☐ 37 ☐ 38 ☐ ☐ ☐ ☐ ☐

1 Please provide the following information on your present job.

_____
Name of Company or Firm (If self-employed, please write self.)

_____
Company or Firm Mailing Address

_____ ☐☐☐☐☐
City State (57) Zip Code

_____
Your Job Title

_____
Your Job Duties

_____

_____

2 Is this job related to the courses you have completed at our college?

62- 1 ☐ Yes, it is directly or closely related
2 ☐ No, it is only remotely related or is not related at all

3 What is your current salary (gross)? (Do not add in overtime.) This information, when combined with others in your field of study, will provide valuable information to other individuals in their own career planning.

(Check one)

$ _____ . _____ PER 1 ☐ HOUR 2 ☐ WEEK 3 ☐ MONTH 4 ☐ YEAR
(63) (70)

4 The salary in the preceding item is based on how many hours per week employment?

_____ Hours per Week
(71-72)

Dates of Employment
From _____ To _____

5 We periodically conduct surveys of employers to help us evaluate the courses we offer and to advise us on other courses and programs which are needed. If we may contact your immediate supervisor so he or she can have the opportunity to participate in such a survey, please supply the below information.

_____
Supervisor's Last Name First Name M.I.

_____
Supervisor's Job Title

_____
Please provide address if different from your company address

_____

6 Please check below if the course(s) you took at our college helped you in your occupational area in any of the following ways.

43-1 ☐ Helped to obtain job
44-1 ☐ Helped performance on present job
45-1 ☐ Helped advance on present job
46-1 ☐ None of the above
47-1 ☐ Other (describe) _____

7 How would you rate the training you received at our college in relation to its usefulness to you in performing your job?

48- 1 ☐ Very Good
2 ☐ Good
3 ☐ Average
4 ☐ Poor
5 ☐ Very poor

8 Would you recommend the course(s) taken at our college to others employed in positions similar to yours?

49- 1 ☐ No
2 ☐ Undecided
3 ☐ Yes

9 Were you employed in your occupational area PRIOR to enrolling in the course(s) completed at our college?

50- 1 ☐ No
2 ☐ Yes

SECTION C

IF YOU HAVE ENROLLED IN ANOTHER COLLEGE SINCE YOUR ENROLLMENT AT OUR COLLEGE, PLEASE ANSWER THIS SECTION. OTHERWISE, SKIP TO SECTION D.

Do not write in this column.

TC 51 ☐ 52 ☐ 53 ☐ 54 ☐ 55 ☐ 56 ☐
TMC 57 ☐ 58 ☐ 59 ☐ 60 ☐ ☐ ☐ ☐ ☐
TYP 77 ☐ 78 ☐ 79 ☐

1 Please provide the below information on your current (or most recently attended) college.

_____
Name of College

_____
City and State

_____
Your Current Major Field of Study

2 Did you have problems transferring to the college indicated above?

65- 1 ☐ Yes, what →
66-1 ☐ Transferring credit hours
67-1 ☐ Transcript problems
68-1 ☐ Admission problems
69-1 ☐ Other (describe) _____
2 ☐ No

3 How many credit hours earned at our college were not accepted at the college indicated above?

70- 1 ☐ All credit hours accepted
2 ☐ Lost 1 - 3 credit hours
3 ☐ Lost 4 - 6 credit hours
4 ☐ Lost 7 - 12 credit hours
5 ☐ Lost 13 - 21 credit hours
6 ☐ Lost more than 21 credit hours

4 In your opinion, how well did our college prepare you for continuing your education?

71- 1 ☐ Very good
2 ☐ Good
3 ☐ Average
4 ☐ Poor
5 ☐ Very Poor

5 If you are currently enrolled in college, please indicate your current status and classification at the college indicated above.

STATUS
72- 1 ☐ Part-time student (Less than 12 hours)
2 ☐ Full-time student (12 or more hours)

CLASSIFICATION
73- 1 ☐ Freshman
2 ☐ Sophomore
3 ☐ Junior
4 ☐ Senior
5 ☐ Graduate student

6 How many credit hours earned at our college were successfully transferred to another institution?

_____ Credit hours transferred
(74-76)

7 What term and year did you first enroll at your transfer institution?

_____ Term _____ Year

SECTION D

ALL STUDENTS SHOULD ANSWER THIS SECTION.

1 Approximately how many credit hours have you completed at our college? Please mark appropriate column.

74- 1 ☐ None
2 ☐ 1 - 10
3 ☐ 11 - 20
4 ☐ 21 - 30
5 ☐ 31 - 40
6 ☐ 41 - 50
7 ☐ 51 - 60
8 ☐ More than 60

2 How do you see the course(s) completed at our college in terms of your career plans:

76-1 ☐ of immediate, direct benefit
77-1 ☐ of long term, direct benefit
78-1 ☐ of indirect benefit
79-1 ☐ of no benefit

3 Are you interested in taking other courses at our college? You may include courses not presently offered by our college.

80- 1 ☐ No
2 ☐ Yes, what course(s)? _____

_____

4 We would appreciate any comments regarding how we could improve the course(s) you have completed and/or services we have provided. Please use the below space (front and back) for your comments.

NRS-DeVAULT

BELOW SPACE RESERVED FOR COMMENTS

(Use reverse side for additional space)

THANK YOU FOR ASSISTING US IN OUR SURVEY! PLEASE RETURN THIS FORM IN THE PRE-PAID ENVELOPE AS SOON AS POSSIBLE!

TX8-4-E (EMP-DeVault) Term:

Tex-SIS FOLLOW-UP

☐ 1

PROJECT FOLLOW-UP

Please make corrections to the information above if necessary.

Note: This survey is authorized by Public Laws 20 USC 2312 and 20 USC 2391. While you are not required to respond to this survey, your cooperation is needed to insure that the results of this effort are comprehensive, reliable, and timely.

☐ 44

FOR COLLEGE USE ONLY

SEX

65- M ☐ Male
F ☐ Female

ETHNIC GROUP

66-
5 ☐ American Indian or Alaskan Native
4 ☐ Asian or Pacific Islander
2 ☐ Black, not of Hispanic Origin
3 ☐ Hispanic
1 ☐ White, not of Hispanic Origin

AGE

67-
B ☐ 16-19
C ☐ 20-24
D ☐ 25-29
E ☐ 30-34
F ☐ 35-44
G ☐ 45-54
H ☐ 55-64
I ☐ 65 and over

Term Date
Mo ☐ 16 ☐ 17 Yr ☐ 20 ☐ 21

Completion Code 73 ☐

Course Type Code
74-
1 ☐ Coop
2 ☐ Non-Coop

Group Code
33-
A ☐ O/T
B ☐ UT
C ☐ OTH
D ☐ VC

Target Pop. Code
1 ☐ REG
2 ☐ DAVT
3 ☐ HNCP
4 ☐ LEP
5 ☐ SP/HOME
6 ☐ SB/STER

Major Code
☐ ☐ ☐ ☐ ☐ ☐
34 35 36 37 38 39

Level Code
76-
2 ☐ Postsecondary
3 ☐ Adult - LT
4 ☐ Adult - ST
5 ☐ OTH

EMP Code ☐ 62

Special Code ☐ 63

IDENTIFICATION ________________________________

☐ ☐ ☐ ☐ ☐ EJT
46 47 48 49 50

JOB TITLE ________________________________

☐ ☐ ☐ ☐

PROGRAM MAJOR ________________________________

☐ ☐ ☐ SIC
55 56 57

____

EMPLOYER (COMPANY NAME - INSTITUTION - ORGANIZATION, ETC.)

1 **Is the job title and status of this individual accurate?**

58-
1 ☐ Yes
2 ☐ No: IF NO, please describe change(s) below.

____

____

2 **What is your relationship with this individual?**

59-1 ☐ Employer
60-1 ☐ Supervisor
61-1 ☐ Personnel staff
62-1 ☐ Co-worker
63-1 ☐ Other (describe) ________________

____

OVER PLEASE!

3

Please rate the training received by this individual in the following personal skill areas. Please respond only to those areas you feel are appropriate.

Do not write in this column

		Very Good 1	Good 2	Average 3	Poor 4	Very Poor 5
a. Accepting responsibility	64-	☐	☐	☐	☐	☐
b. Punctuality	65-	☐	☐	☐	☐	☐
c. Personal initiative	66-	☐	☐	☐	☐	☐
d. Willingness to learn	67-	☐	☐	☐	☐	☐
e. Co-worker cooperation	68-	☐	☐	☐	☐	☐
f. Management cooperation	69-	☐	☐	☐	☐	☐
g. Work attendance	70-	☐	☐	☐	☐	☐
h. Work attitude	71-	☐	☐	☐	☐	☐
i. Personal appearance	72-	☐	☐	☐	☐	☐
j. Compliance with policies	73-	☐	☐	☐	☐	☐

4

Please rate the training received by this individual in the following technical skill areas. Please respond only to those areas you feel are applicable to the occupational area.

		Very Good 1	Good 2	Average 3	Poor 4	Very Poor 5
a. Mathematical skills	34-	☐	☐	☐	☐	☐
b. Technical knowledge	35-	☐	☐	☐	☐	☐
c. Organizational ability	36-	☐	☐	☐	☐	☐
d. Communication skills	37-	☐	☐	☐	☐	☐
e. Problem solving skills	38-	☐	☐	☐	☐	☐
f. Work quality	39-	☐	☐	☐	☐	☐
g. Work quantity	40-	☐	☐	☐	☐	☐
h. Manual dexterity	41-	☐	☐	☐	☐	☐
i. Meeting the public	42-	☐	☐	☐	☐	☐
j. Following instructions	43-	☐	☐	☐	☐	☐
k. Operation of equipment	44-	☐	☐	☐	☐	☐

5

What is your overall rating of the training received by this individual as it relates to the requirements of his or her job?

45–
1 ☐ Very good
2 ☐ Good
3 ☐ Average
4 ☐ Poor
5 ☐ Very poor

6

What, in your opinion, is the job outlook for program employees of this particular occupational field?

Do not write in this column.

Present			Future
46–	1 ☐	Very good	47– 1 ☐
	2 ☐	Good	2 ☐
	3 ☐	Average	3 ☐
	4 ☐	Poor	4 ☐
	5 ☐	Very poor	5 ☐

7

As a result of this person's training, how would you rate his or her preparation in relation to other employees in his or her working group who did not receive such training?

48–
1 ☐ No basis for comparison
2 ☐ Individual is better prepared
3 ☐ Both are about the same
4 ☐ Individual is less prepared

8

To what extent, if any, has this individual's training added to his or her ability for job placement and advancement?

49–
1 ☐ Very much
2 ☐ Much
3 ☐ Average
4 ☐ Very little
5 ☐ None

9

What was the primary source(s) for the initial hiring of this individual?

50-1 ☐ Employment agency
51-1 ☐ College faculty member
52-1 ☐ College job placement office
53-1 ☐ Mutual acquaintance
54-1 ☐ Applicant applied on own initiative
55-1 ☐ Other (describe) ____________________

____

____

A

What suggestions do you have for improving the technical and/or personal skills of future employees?

B

What, in your opinion, are additional areas of training (job titles, skills, etc.) in which our school should become involved?

EMP-DeVAULT

THANK YOU FOR ASSISTING US IN OUR SURVEY! PLEASE RETURN THIS FORM IN THE PRE-PAID ENVELOPE AS SOON AS POSSIBLE!

XIII. CAREER LADDER INFORMATION

The following is a career ladder for a student who is interested in pursuing a career in the area of dairy products management. The 2+2 program provides for exit points at different levels with the job benefits and type of skills performed appropriate with the level of education attained. These jobs are only entry level jobs with promotion and benefit increases possible.

EXIT LEVEL	JOB TITLE
Postsecondary (Grade 16) **Baccalaureate Degree**	Dairy Farm Manager Processing Plant Supervisor
Postsecondary (Grade 14)	Dairy Farm Assistant Manager Processing Plant Assistant Foreman
Secondary (Grade 12)	Dairy Farm Worker Processing Line Worker

The careers in the dairy industry are not limited to those listed on the previous page.

The following is only a partial list of career opportunities in the dairy science areas.

Field operations

Dairy Farm Manager/Owner
Dairy Equipment Sales Representative
Artificial Insemination Technician
Dairy Production Field-Contact Technician
Dairy Herd Supervisor
DHIA Supervisor

Research and Technical Support

Dairy Genetic Scientist
Dairy Disease Control Technician
Quality Control/Food Safety Technician
Dairy Nutritionist
Dairy Environmental Technician
Product Development Coordinator

Sales And Marketing

Sales Manager
Advertising/Public Relations
Database Management Specialist
Distribution Manager
Marketing Representative
Computer Programmer
Information Systems Analyist

Processing/Management

Shipping Superintendent
Fresh Milk Processing Superintendent
Processing Plant Manager
Maintenance Superintendent
Processed Foods Processing Superintendent

XIV. RECOMMENDED TEACHER APPROVAL CRITERIA

The following is the recommended teacher approval criteria for a secondary agriscience teacher training students for the 2+2+2 Dairy Products Management Program.

TEACHER APPROVAL CRITERIA

Secondary teachers who plan to initiate a 2+2 +2 Agricultural Program in the area of Poultry Products Management or Dairy Products Management should have the following qualifications:

1. The teacher should have a valid Texas Teacher Certificate with Agricultural Science and Technology certification.
2. The teacher should have attended animal science related workshops as approved by the Texas Education Agency.
3. It is not necessary but is recommended that the teacher have taught within the last three years at the time of implementation of the 2+2 program or be a recent graduate (within the past 12 months) of an approved agricultural education program from a Texas college or university.

XV. ARTICULATION AGREEMENT

The following is an example articulation agreement to be signed by the secondary and postsecondary institutions who are interested in providing the agriculture 2+2 curriculum for their students.

AGRICULTURAL OCCUPATIONS 2+2+2 PROGRAM

ARTICULATION AGREEMENT

PURPOSE

1. To eliminate duplication of effort between area secondary and postsecondary educational institutions in the delivery of agriscience courses.

2. To optimize student enrichment by providing coordinated curriculum to insure a continuous learning path, beginning at the secondary level and continuing to the postsecondary level.

3. To assure that students are adequately equipped with the necessary academic and vocational skills to gain and hold employment upon graduation from both secondary and postsecondary levels.

AGREEMENT

1. Secondary institutions which are a party to this agreement hereby agree to:

    a. Evaluate and recruit students who have, in their opinion, necessary qualifications to successfully complete the Agricultural Occupations 2+2 or 2+2+2 Articulated Program.

    b. Offer and maintain for the duration of this agreement the agriscience courses designated as a part of the Agriculture 2+2+2 Articulated Program or a series of courses containing the same competencies.

    c. Maintain necessary records to track and evaluate individual student's progress of required agriscience competencies as contained in the Agricultural Occupations 2+2+2 Articulated Program. Such records will be forwarded to the postsecondary institution upon request.

2. The postsecondary institutions which are a part of this agreement hereby agree to:

    a. Assist secondary institutions which are a party to this agreement in evaluating and recruiting students.

    b. Offer and maintain for the duration of this agreement Applied and Associate Degree curriculum and resources as specified in the Agricultural Occupations 2+2 and 2+2+2 Articulated Program. No student will be allowed to enter the associate degree program without having first successfully completed the competencies required in the secondary portion of the Agricultural Occupations 2+2+2 Articulated Program.

AGRICULTURAL OCCUPATIONS 2+2+2 PROGRAM

ARTICULATION AGREEMENT
Continued

c. Provide an adequately trained faculty to administer and teach the Agricultural Occupations Applied and Associate Degree curriculum.

d. Provide assessment of students upon entry to the postsecondary institution(students must score 80% or greater on materials covered in secondary program) and counsel students regarding the Applied vs the Associate Degree Programs.

e. Continue student records provided by secondary institutions; maintain adequate records during applied or associate degree program; and track student progress through at least one year of employment and provide to employers upon request.

REVIEW AND CHANGE PROCESS

At the end of one year from the date of this agreement, a review of the Articulation Agreement of the Agricultural Occupations 2+2+2 Articulated Program will be conducted. All superintendents, principals, counselors, vocational administrators, instructors from secondary schools, administrators and instructors from postsecondary schools, and industry representatives will be invited to provide input for review and revision.

PROVISION FOR IMPLEMENTATION/TERMINATION

This agreement will become effective upon approval by the President of ______________________________ College and the Superintendent of ______________________________ Independent School District. Upon implementation, this agreement will continue on an annual basis until one of the parties petitions the other party to end the agreement.

Such petition to end the agreement (1) must be submitted one year in advance of the intent to terminate; (2) must be submitted in writing signed by the college president or school superintendent making the petition; and (3) must be delivered to the second party of the agreement. Delivery of the intent to terminate will constitute formal notification and will serve as grounds for termination one year following the date of delivery.

______________________________ President	______________________________ Superintendent
______________________ College	______________________ ISD
______________________ 1990	______________________ 1990